United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
United States Department
of Agriculture, Forest
Service; United States
Department of the
Interior, Bureau of Indian
Affairs; North Carolina
Department of
Environment, Health, and
Natural Resources; North
Carolina Agricultural
Research Service; North
Carolina Cooperative
Extension Service;
Jackson Soil and Water
Conservation District; and
Jackson County Board of
Commissioners

Soil Survey of Jackson County, North Carolina

How To Use This Soil Survey

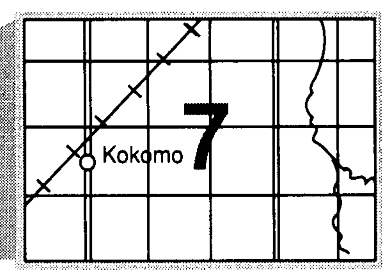
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

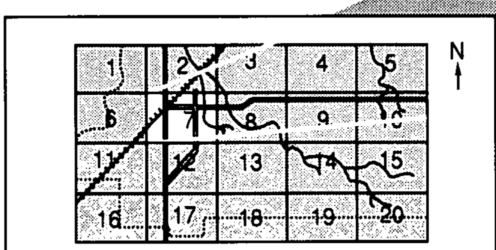
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



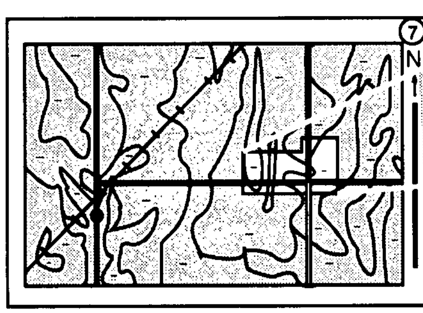
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

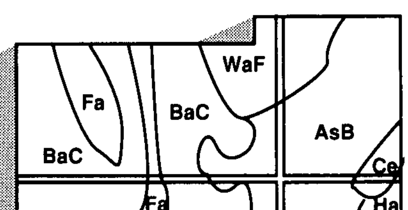


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the North Carolina Agricultural Research Service, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1989. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1991. This soil survey was made cooperatively by the Natural Resources Conservation Service; the United States Department of Agriculture, Forest Service; the United States Department of the Interior, Bureau of Indian Affairs; the North Carolina Department of Environment, Health, and Natural Resources; the North Carolina Agricultural Research Service; the North Carolina Cooperative Extension Service; the Jackson Soil and Water Conservation District; and the Jackson County Board of Commissioners. The survey is part of the technical assistance furnished to the Jackson Soil and Water Conservation District. The Jackson County Board of Commissioners provided financial assistance for the survey.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

The first soil survey of Jackson County was published in 1948 by the U.S. Department of Agriculture. This survey updates the first survey, provides more detailed maps on aerial photographs, and contains more interpretive information *(15)*.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Christmas trees on Chandler gravelly fine sandy loam, 8 to 15 percent slopes, and Chandler gravelly fine sandy loam, 15 to 30 percent slopes, in Zacharys Gap in Jackson County.

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Issued June 1997

Index to Map Units

Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Jackson County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the North Carolina Cooperative Extension Service.

Richard A. Gallo
State Conservationist
Natural Resources Conservation Service

Soil Survey of Jackson County, North Carolina

By Michael L. Sherrill, Natural Resources Conservation Service

Soils surveyed by Michael L. Sherrill, Mark S. Hudson, L. Lee Mallard, III, Brian A. Wood, Steven T. Evans, and Phyllis D. Hockett, Natural Resources Conservation Service; Scott C. Keenan and Thomas N. Schmitt, North Carolina Department of Environment, Health, and Natural Resources; Sara A. Browning, U.S. Forest Service; and John M. King, private contractor

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
United States Department of Agriculture, Forest Service; United States Department of the Interior, Bureau of Indian Affairs; North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Jackson Soil and Water Conservation District; and Jackson County Board of Commissioners

JACKSON COUNTY is in the southwestern part of North Carolina, about 235 miles west of Raleigh, the State capital (fig. 1). The total area of the county is 495 square miles, or 316,877 acres. According to the 1980 census, the population of the county was 25,811. Sylva, the county seat, had a population of 1,700.

This county is in the Blue Ridge Mountain physiographic region. It is bordered on the north by Swain County, on the west by Swain and Macon Counties, on the east by Haywood and Transylvania Counties, and on the south by Oconee County, South Carolina. The elevation ranges from 1,850 feet above sea level near Whittier to 6,450 feet at the summit of Richland Balsam.

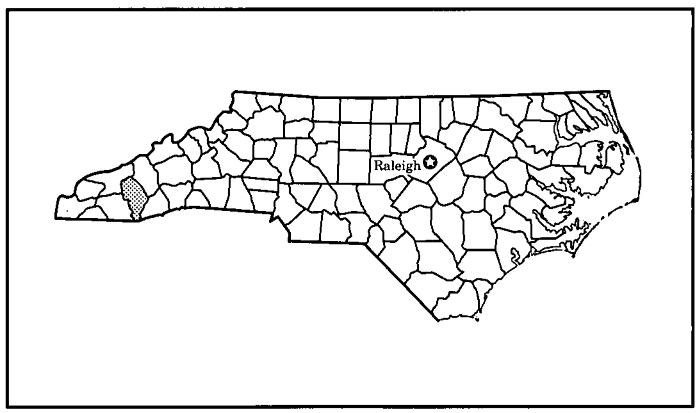

Figure 1.—Location of Jackson County in North Carolina.

General Nature of the County

George E. Frizzell, local historian, helped prepare this section.

This section provides general information about Jackson County. It describes the history and development; population trends; industrial and agricultural trends; water resources; physiography, relief, and drainage; and climate.

Jackson County is essentially rural and wooded. Its terrain varies from relatively flat basins to narrow valleys and from rolling hills to very steep mountains. Geography has had a tremendous impact on the county's development. Historically, the mountains were a barrier to the development of natural and human

resources. Recently, the construction of highways and promotion of the county have made new economic, educational, and cultural opportunities available *(13)*.

History and Development

The Cherokees are the only Indian Nation to have occupied the area that is now western North Carolina in historic times, and Cherokee place names are still common. Several Cherokee towns were in the Tuckasegee River valley, but the centers of Cherokee population shifted to the northern part of what is now Jackson County as settlers began to arrive. Part of the county was opened to settlers by 1800, and the Cherokee Nation ceded all of the remaining lands in the county in 1819 *(4)*. According to the 1980 Federal Census, however, more than 2,400 Native Americans still live in the county.

The Eastern Band of the Cherokee Nation is one of the two Indian tribes in North Carolina recognized by the Federal Government. They are descendants of those Indians who remained in the area despite land cessions and efforts to remove them to Indian Territory with the main body of the Cherokee Nation. Today, the Eastern Band of the Cherokee Nation owns 19,347 acres in the northern part of the county, which represents about one-third of their total reservation holdings *(5)*.

Settlers entering the area after 1800 included those of Scottish, Scotch-Irish, English, German, French, and African origin *(5)*. By 1850, a new county needed to be formed because of the requirements of civil government and the constraints imposed by the terrain on transportation and community interaction. Jackson County was formed in 1851 from parts of Haywood and Macon Counties. It was named in honor of former President Andrew Jackson. Webster was the first county seat. The county seat was moved to Sylva in 1913 by popular vote, however, after Webster's economic fortunes declined and a railroad line brought increasing prosperity to Sylva *(9)*.

Population Trends

After two decades of decline, the population of Jackson County has grown since 1960. By 1988, the county had a population of 27,000 *(7)*. Several factors contributed to this growth. Better economic opportunities have reduced out-migration of the county's young people and also created jobs for newcomers. Also, senior citizens have chosen the mountains as a suitable place to permanently retire. The average density of 53 inhabitants per square mile in the county is misleading because most of the people are concentrated along the Tuckasegee River valley and its tributaries or in coves in the mountains. Sylva, the largest incorporated town, had a population of more than 2,000 in 1988 *(7)*.

Industrial and Agricultural Trends

Initial isolation and a steady improvement in transportation facilities have determined the industrial and agricultural development of Jackson County. When transportation was crude and inadequate, the early settlers were largely self-sufficient both agriculturally and economically. The construction of a railroad line into the county in 1884 opened opportunities for large-scale mining and forestry operations *(4)*.

Commercial mining of kaolin and mica, the two most intensively exploited minerals, began in the late 1800's. The county was a major producer of kaolin, which is used for pottery, before production was halted in 1925. Other minerals mined on a smaller scale were corundum, olivine, gold, copper, nickel, and chromium. Production and marketing problems and competition from other sources have hindered the continuous and extensive exploitation of the county's mineral resources *(4)*.

Several commercial attempts at large-scale timber operations began in 1890. Blight destroyed the prominent chestnut trees in the 1930's, but the timber and wood product industries continued to thrive into the 1970's *(11)*.

The industrial base in the county still includes wood product operations and mining. Also, plants producing apparel and textile products began operations in 1953 and are now vital parts of the economy *(11)*. About 11 percent of the county's work force is in manufacturing. In contrast, agriculture accounts for only 1.5 percent of the work force. The 234 farms total 18,069 acres, although many families maintain private gardens *(22)*. The major agricultural products are hay, tobacco, cabbage, Christmas trees, native ornamentals, and corn. The production of Christmas trees and native ornamentals has grown rapidly in recent years as pasture and hayland are converted to growing these ornamental crops *(11)*.

Water Resources

Jackson County has an abundant supply of water from rivers, streams, and ground-water sources. High-quality water that flows from watersheds that are dominantly wooded is important to tourism in the county. Streams that flow from watersheds that have many roads, homes, or farms generally have lower quality of water. Sediment is the main problem. The quality of streams can be improved by soil and water conservation practices. Drilled wells are the most

common source of domestic water. Some springs also are used for water supplies. The water for the town of Sylva is from a reservoir on Fisher Creek.

Physiography, Relief, and Drainage

The terrain in Jackson County varies from nearly level flood plains to almost vertical rock cliffs. The physiography of the county consists of high, intermediate, and low mountains; flood plains; and stream terraces.

The high mountain landscape is above 4,800 feet in elevation. These areas are mainly in the eastern part of the county along the Blue Ridge Parkway. This landscape is exposed to cold temperatures and high winds. It has very deep to shallow, well drained soils that are high in organic matter content.

The intermediate mountain landscape ranges from 3,500 to 4,800 feet in elevation. It is the most extensive landscape in the county. The intermediate mountains have very deep to shallow, well drained to excessively drained soils on side slopes and ridges. Very deep, well drained and moderately well drained soils are in coves and drainageways. The soils on cool aspects and in coves and drainageways have a topsoil that is high in organic matter content. The soils on warm aspects have a topsoil that is medium in organic matter content.

The low mountain landscape ranges from 1,850 to 3,500 feet in elevation. It has very deep and moderately deep, well drained soils on side slopes and ridges. Very deep, well drained soils are in coves and drainageways. The soils in coves and drainageways and on cool aspects have a topsoil that is high in organic matter content. The soils on warm aspects have a topsoil that is medium in organic matter content.

The flood plains and stream terraces range from 1,850 to 3,000 feet in elevation. They are along streams, such as the Tuckasegee River, Scott Creek, and Caney Fork Creek. They have very deep, well drained to very poorly drained soils. The soils on flood plains and on the lower stream terraces have a topsoil that is high in organic matter content. The soils on high stream terraces have a topsoil that is medium in organic matter content.

Relief varies greatly from one landscape to another. The mountain landscapes have strong relief and dominantly steep and very steep slopes. Mountain ridgetops and coves are mainly gently sloping to moderately steep. The stream terraces and flood plains have low relief and are nearly level to moderately steep.

The county is largely in the Tuckasegee River Watershed and drains to the north. Major tributaries include Caney Fork Creek, Scott Creek, Savannah Creek, and Greens Creek. A small part of the county drains to the south. The southwestern corner of the county is drained by the Chattooga River, and the southeastern corner is drained by the Whitewater River.

Climate

The climate in Jackson County varies greatly from the high mountains to the flood plains along creeks and rivers. The climate at any particular place in the county is influenced by elevation, aspect, and location to the moisture laden winds from the Gulf of Mexico, which enter the county from the south. Annual precipitation varies significantly in the county. It averages about 50 inches in Cullowhee and as much as 100 inches south of Cashiers. The amount of rainfall and snowfall generally increases as the elevation increases and the temperature and growing season decrease. Similar variations occur in temperature, snowfall, freeze dates, and length of the growing season. The data in tables 1, 2, and 3 reflect the climate of the valleys in the central part of the county and do not necessarily apply to other parts of the county.

The higher elevations in the county receive significant amounts of unmeasured precipitation, which occurs as fog in the warmer months and rime ice in the colder months. Precipitation is heavy and evenly distributed throughout the year. Precipitation in summer falls mainly during thunderstorms. Precipitation in winter is mainly rain and occasional snow in the valleys. It is mainly snow in the higher mountains, although rainfall is frequent in those areas. Snow cover does not persist, except at the highest elevations.

In winter, the valleys are very cool and have occasional cold and warm spells. The upper slopes and mountaintops generally are cold and windy, especially on prominent north-south trending mountains. In summer, the valleys are very warm and frequently hot during the day but become cool at night as the air cools and drains down the mountains and collects in the valleys.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Cullowhee, North Carolina, in the period 1951 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 39 degrees F and the average daily minimum temperature is 27 degrees. The lowest temperature on record, which occurred at Cullowhee on February 18, 1958, is -14 degrees. In summer, the average temperature is 72 degrees and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred at Cullowhee on July 28, 1952, is 99 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 50 inches. Of this, 24 inches, or 49 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall during the period of record was 4.02 inches at Cullowhee on May 28, 1973. Thunderstorms occur on about 46 days each year.

The average seasonal snowfall is 12 inches. The greatest snow depth at any one time during the period of record was 13 inches. On an average of 2 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 60 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the north. Average windspeed is highest, 10 miles per hour, in winter.

How This Survey Was Made

This survey was made to provide information about the soils in Jackson County. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They studied many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Soils occur in an orderly pattern that results from the combined influence over time of climate, parent material, relief, and plants and animals. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. This model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify the soils. After describing the soils and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. The data from these analyses and tests and from field-observed characteristics and soil properties are used to predict behavior of the soils under different uses. Interpretations are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a relatively high

degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will be at a specific level in the soil on a specific date.

Soil boundaries are drawn on aerial photographs and each delineation is identified as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in accurately locating boundaries.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called minor soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are identified in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general soil map of Jackson County does not join those of Oconee County, South Carolina, and Transylvania County, North Carolina, because of differences in detail and the large number of new soil series that were correlated in Jackson County. Major landform boundaries, however, are joined with those of Transylvania County.

Areas of Soils That Have a Loamy Surface Layer and Subsoil and Formed in Material Weathered from High-Grade Metamorphic Rocks, Colluvium, or Alluvium and Areas of Rock Outcrop

1. Evard-Cowee-Saunook-Trimont

Gently sloping to very steep, very deep to moderately deep, well drained soils; on uplands and in coves in the low mountains

The landscape of this map unit consists of moderately rugged, dissected low mountains that have long side slopes and narrow, winding ridgetops and drainageways (fig. 2). Slopes range from 2 to 95 percent. Numerous drainageways join and become creeks, which join the rivers. Streams flow in winding courses through bowl- and finger-shaped coves and flood plains.

This map unit makes up about 25 percent of the county. It is about 40 percent Evard soils, 19 percent Cowee soils, 11 percent Saunook soils, 10 percent Trimont soils, and 20 percent minor soils. The minor soils include Plott, Edneyville, and Chestnut soils on intermediate mountains; Dellwood, Nikwasi, Cullowhee, and Reddies soils along flood plains; Braddock soils on high stream terraces; Cullasaja and Tuckasegee soils in coves; and Fannin soils on mountains. Fannin soils have more mica than the major soils. Small areas of rock outcrop are common in the steeper areas of this map unit.

Evard soils are very deep and are strongly sloping to very steep. They commonly are on ridgetops and south- to west-facing side slopes. Typically, the surface layer is dark brown and strong brown gravelly loam. The subsoil is red clay loam in the upper part and mottled red, yellowish red, and strong brown loam in the lower part. The underlying material is multicolored sandy loam.

Cowee soils are moderately deep and are strongly sloping to very steep. They are on ridgetops and south- to west-facing side slopes. The surface layer is reddish brown gravelly sandy loam. The subsoil is red gravelly sandy loam and gravelly sandy clay loam. Weathered bedrock is at a depth of 27 inches.

Saunook soils are very deep and are gently sloping to moderately steep. They are on benches and toe slopes in coves. Typically, the surface layer is dark brown gravelly loam. The subsoil is strong brown gravelly clay loam, gravelly sandy clay loam, gravelly sandy loam, and sandy loam. The underlying material is yellowish brown cobbly fine sandy loam.

Trimont soils are very deep and are steep and very steep. They are on north- to east-facing side slopes. The surface layer is dark brown gravelly loam. The subsoil is reddish brown and yellowish red loam and clay loam.

Most areas of this map unit are used for commercial timber. Recreational uses and homesites are also

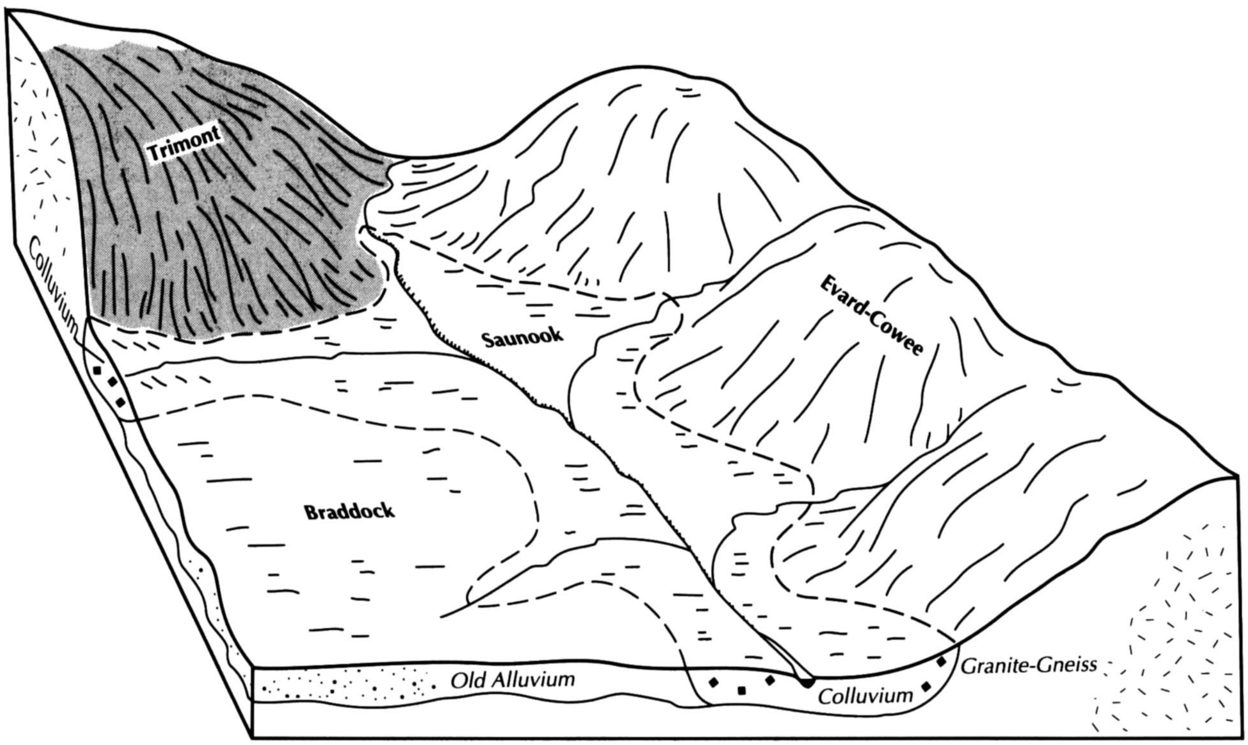

Figure 2.—Relationship of soils, aspect, parent material, and landscape position in the Evard-Cowee-Saunook-Trimont general soil map unit.

important. Pasture and crops are grown in some of the less sloping areas.

The mountain ridgetops and the south- to west-facing slopes are dominated by scarlet oak, chestnut oak, hickory, pitch pine, and white oak. The north- to east-facing slopes are dominated by yellow-poplar, northern red oak, black cherry, sweet birch, and white oak. The coves, toe slopes, and areas along drainageways are dominated by yellow-poplar. Productivity is affected by variation in rainfall in this unit. The soils in coves, on toe slopes, along drainageways, and on the north- to east-facing side slopes are preferred for timber production. Logging is difficult in the steep and very steep areas. Building and maintaining access roads are costly in this map unit. The slope and the hazard of erosion are the main management concerns on the major soils. The depth to bedrock also is a limitation in the Cowee soils.

The less sloping areas that are not federally owned commonly are cleared of trees. The Evard and Cowee soils are used as pasture and hayland. The Saunook soils are commonly used for the production of hay, Christmas trees, landscaping plants, strawberries, and tomatoes.

Some areas of the well drained minor soils on flood plains, in coves, and on toe slopes are used for the production of high-value crops, such as Christmas trees, landscaping plants, burley tobacco, tomatoes, and strawberries.

A few of the less sloping areas of the major soils and some areas of the minor soils are used intensively for pasture, hay, and crops. The Evard and Cowee soils are commonly used as pasture and hayland. The Saunook soils and many areas of the minor soils in coves, along toe slopes, and on flood plains are used for the production of high-value crops, such as burley tobacco, tomatoes, strawberries, landscaping plants, and Christmas trees. The slope and the hazard of erosion are the main management concerns on the major soils. The flooding and the wetness are the main management concerns on the minor soils on flood plains.

Large areas of this map unit are used for hiking, camping, fishing, hunting, and sightseeing. The slope is the main limitation.

This unit is increasingly being used for homesites. The slope is the main limitation on the major soils. The depth to bedrock also is a limitation in the Cowee soils.

2. Plott-Edneyville-Chestnut-Cullasaja

Strongly sloping to very steep, very deep to moderately deep, well drained soils; on uplands and in coves in the intermediate mountains

The landscape of this map unit consists of rugged, dissected intermediate mountains that have long side slopes and narrow, winding ridgetops and drainageways (fig. 3). Slopes range from 8 to 95 percent. The numerous drainageways join and become creeks and rivers. Streams flow in winding courses through bowl- and finger-shaped coves, along toe slopes, and through narrow flood plains and gorges that have small areas of rock outcrop.

This map unit makes up about 40 percent of the county. It is about 24 percent Plott soils, 19 percent Edneyville soils, 15 percent Chestnut soils, 15 percent Cullasaja soils, and 27 percent minor soils. The minor soils include Cleveland soils near areas of rock outcrop; Chandler, Fannin, and Cashiers soils in areas on low and intermediate mountains; Evard, Cowee, and Trimont soils on low mountains; Tuckasegee, Whiteside, and Sylva soils in coves; and Cullowhee, Dellwood, Nikwasi, and Reddies soils along narrow flood plains. Chandler, Fannin, and Cashiers soils have more mica than the major soils.

Plott soils are very deep and are moderately steep to very steep. They are on north- to east-facing mountain side slopes and on moderately steep ridgetops on the shaded or the higher parts of the intermediate mountains. Typically, the surface layer is very dark grayish brown and dark brown fine sandy loam and gravelly fine sandy loam. The subsoil is dark yellowish brown or yellowish brown gravelly loam and cobbly fine sandy loam. The underlying material is light yellowish brown and multicolored cobbly sandy loam.

Edneyville soils are very deep and are strongly sloping to very steep. They commonly are on south- to west-facing mountain ridgetops and side slopes. Typically, the surface layer is dark brown gravelly fine sandy loam. The subsoil is strong brown fine sandy loam and yellowish brown sandy loam. The underlying material is multicolored sandy loam.

Chestnut soils are moderately deep and are strongly sloping to very steep. They commonly are on south- to west-facing mountain ridgetops and side slopes.

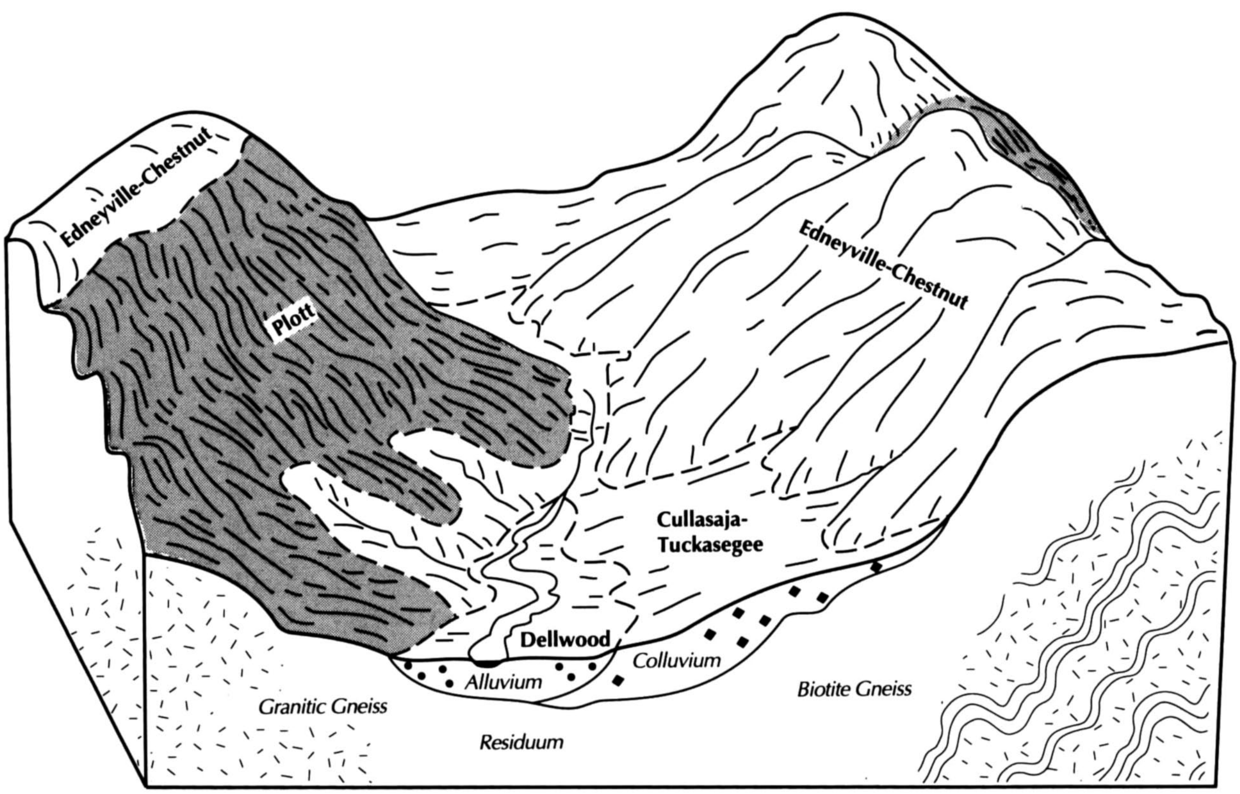

Figure 3.—Relationship of soils, aspect, parent material, and landscape position in the Plott-Edneyville-Chestnut-Cullasaja general soil map unit.

Typically, the surface layer is dark yellowish brown gravelly fine sandy loam. The subsoil is strong brown fine sandy loam. The underlying material is strong brown gravelly sandy loam. Weathered bedrock is at a depth of 28 inches.

Cullasaja soils are very deep and are strongly sloping to very steep. They are on toe slopes and benches and along drainageways in coves. Typically, the surface layer is black and very dark brown very cobbly fine sandy loam. The subsoil is dark yellowish brown very cobbly fine sandy loam, yellowish brown very cobbly sandy loam, and dark yellowish brown extremely cobbly sandy loam.

Most areas of this map unit are used for commercial timber. The production of Christmas trees and other ornamental plants and outdoor recreational uses are also important.

The natural vegetation is mainly hardwoods, but eastern white pine is dominant in some areas. The mountain ridgetops and the south- to west-facing slopes are dominated by scarlet oak, chestnut oak, hickory, pitch pine, and eastern white pine. The north- to east-facing slopes are dominated by northern red oak, black cherry, sweet birch, sugar maple, and yellow-poplar. The coves, toe slopes, and areas along drainageways are dominated by yellow-poplar. Productivity is generally better in the areas that have higher rainfall. Logging is difficult in the very steep areas. Building and maintaining access roads are difficult and costly in the steep and very steep areas. The soil material and saprolite in areas of this map unit, however, can be easily compacted. This map unit is better suited to year-round logging than the other map units in the county.

The less sloping areas of the major soils and most areas of the minor soils are intensively used for Christmas trees, native ornamentals, ginseng, cabbage, broccoli, pasture, or hay. Many areas are used for outdoor recreational purposes.

The slope and the hazard of erosion are the main management concerns. Also, the moderate depth to weathered bedrock in the Chestnut soils and large stones in the Cullasaja soils are severe limitations affecting many uses.

3. Cleveland-Rock Outcrop-Chestnut

Moderately steep to very steep, moderately deep or shallow, well drained and somewhat excessively drained soils; on uplands in the intermediate mountains

The landscape of this map unit is characterized by prominent mountain peaks and rock cliffs (fig. 4). Ridgetops are rounded, moderately steep or steep stringers that connect distinct mountain peaks. Slopes range from 15 to 95 percent.

This map unit makes up about 7 percent of the county. It is about 39 percent Cleveland soils, 27 percent areas of Rock outcrop, 20 percent Chestnut soils, and 14 percent minor soils. The minor soils are Cullasaja and Tuckasegee soils in local depressions and Edneyville soils on the smoother parts of ridgetops.

Cleveland soils are somewhat excessively drained, shallow, and moderately steep to very steep. They are on ridgetops and side slopes. Typically, the surface layer is black sandy loam. The subsoil is yellowish brown loam. Hard bedrock is at a depth of 17 inches.

The areas of Rock outcrop generally are nearly vertical but range to moderately steep.

Chestnut soils are well drained, moderately deep, and moderately steep to very steep. They are on ridgetops and side slopes. Typically, the surface layer is dark yellowish brown gravelly fine sandy loam. The subsoil is strong brown fine sandy loam. The underlying material is strong brown gravelly sandy loam. Weathered bedrock is at a depth of 28 inches.

Nearly all of the acreage in this map unit is wooded. This unit is not managed for commercial timber, however, because the trees are severely stunted by the frequent winds and ice. Because of its scenic views, this unit is used for outdoor recreational purposes and vacation homes.

The slope, the shallow to moderate depth to bedrock, stones, numerous areas of Rock outcrop, the hazard of erosion in bare areas, and the severe climate are the main management concerns.

4. Whiteside-Tuckasegee-Nikwasi

Nearly level to strongly sloping, well drained to very poorly drained soils that are very deep to moderately deep to strata of sand, gravel, and cobbles; in coves and on flood plains along small streams

The landscape of this map unit consists of large colluvial flats at the head of drainageways and on toe slopes in coves and on narrow flood plains in the intermediate mountains (fig. 5). Slopes range from 0 to 15 percent. The drainageways join and become small branches, which join the creeks and rivers.

This map unit makes up about 1 percent of the county. It is about 25 percent Whiteside soils, 22 percent Tuckasegee soils, 16 percent Nikwasi soils, and 37 percent minor soils. The minor soils are Cullasaja soils on toe slopes in coves; Cullowhee soils on flood plains; Edneyville, Chestnut, and Cleveland soils on uplands along the edge of the map unit; Sylva soils on colluvial flats at the head of drainageways; and Udorthents in disturbed areas around Cashiers.

Whiteside soils are very deep, nearly level to strongly sloping, and moderately well drained. They are on

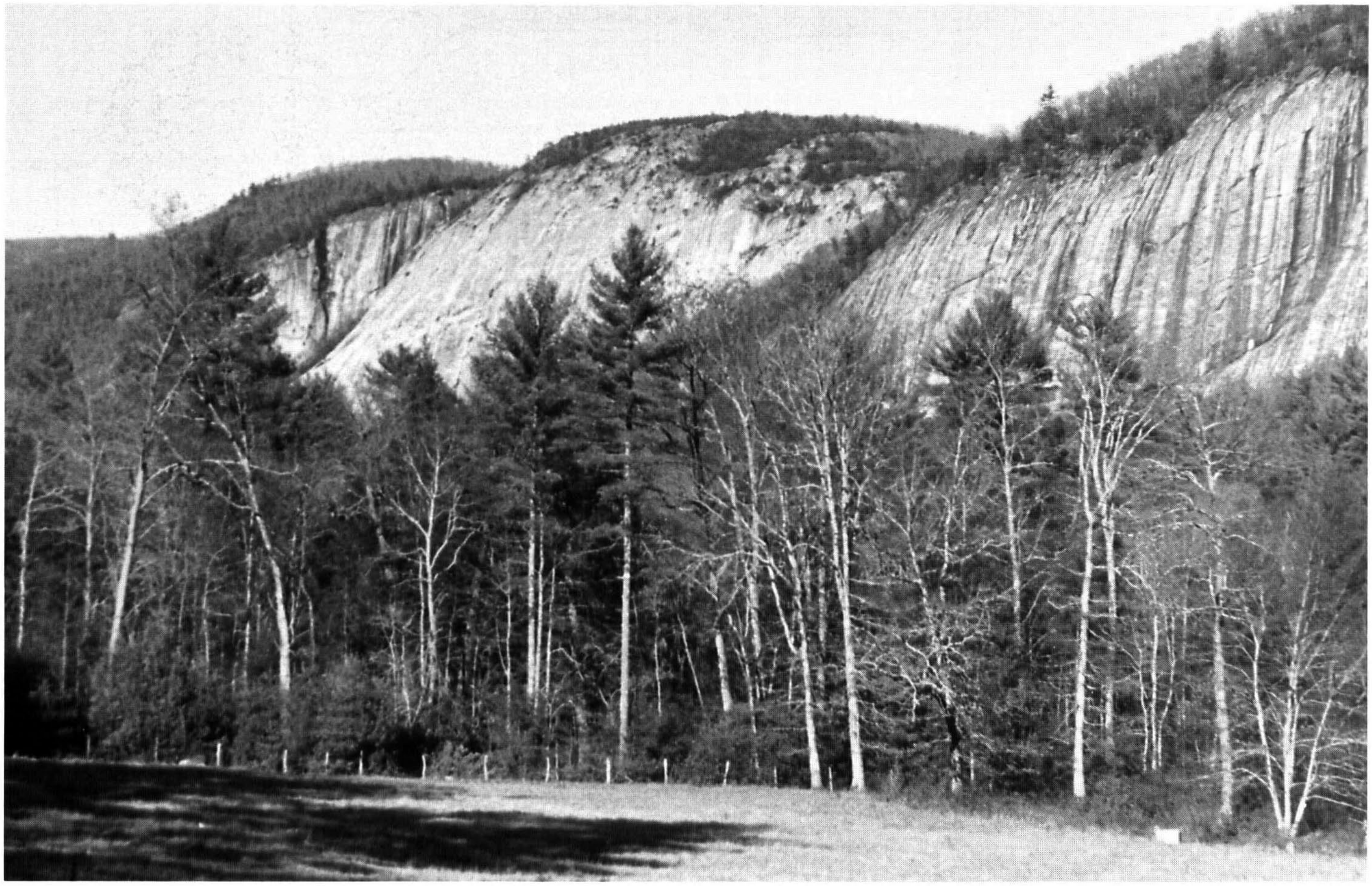

Figure 4.—Outcrops of high-grade metamorphic bedrock in the Cleveland-Rock outcrop-Chestnut general soil map unit.

colluvial flats and toe slopes in coves. Typically, the surface layer is very dark grayish brown fine sandy loam. The upper part of the subsoil is yellowish brown sandy clay loam. The next part is yellowish brown sandy clay loam that has strong brown and gray mottles. The lower part is gray fine sandy loam that has yellowish brown mottles. The underlying material is light brownish gray sandy loam in the upper part and gray sandy clay loam in the lower part.

Tuckasegee soils are very deep, gently sloping and strongly sloping, and well drained. They are on toe slopes and benches in coves. Typically, the surface layer is very dark brown gravelly loam. The subsoil is dark yellowish brown loam and gravelly loam in the upper part and yellowish brown gravelly fine sandy loam and gravelly sandy clay loam in the lower part.

Nikwasi soils are nearly level, poorly drained and very poorly drained, and moderately deep to strata of sand, gravel, and cobbles. They are on flood plains. Typically, the surface layer is very dark grayish brown and very dark gray fine sandy loam. The underlying material is dark grayish brown and multicolored extremely gravelly coarse sand.

Land use patterns are complex in areas of this map unit and include such uses as woodland, cropland, residential development, recreational development, and wilderness preservation. The areas west of Thorpe Lake are used mainly for cabbage, broccoli, pasture, or hay. Pasture, urban development, and recreational development are the major land uses along the Horse Pasture River. Woodland is the major use along Norton Creek and Grassy Camp Creek. Urban development and recreational development are the major uses around and south of Cashiers. Wilderness preservation and outdoor recreation are major uses in the Panthertown Creek area.

The wetness and the slope are the main limitations in areas of the Whiteside soils. The flooding and wetness

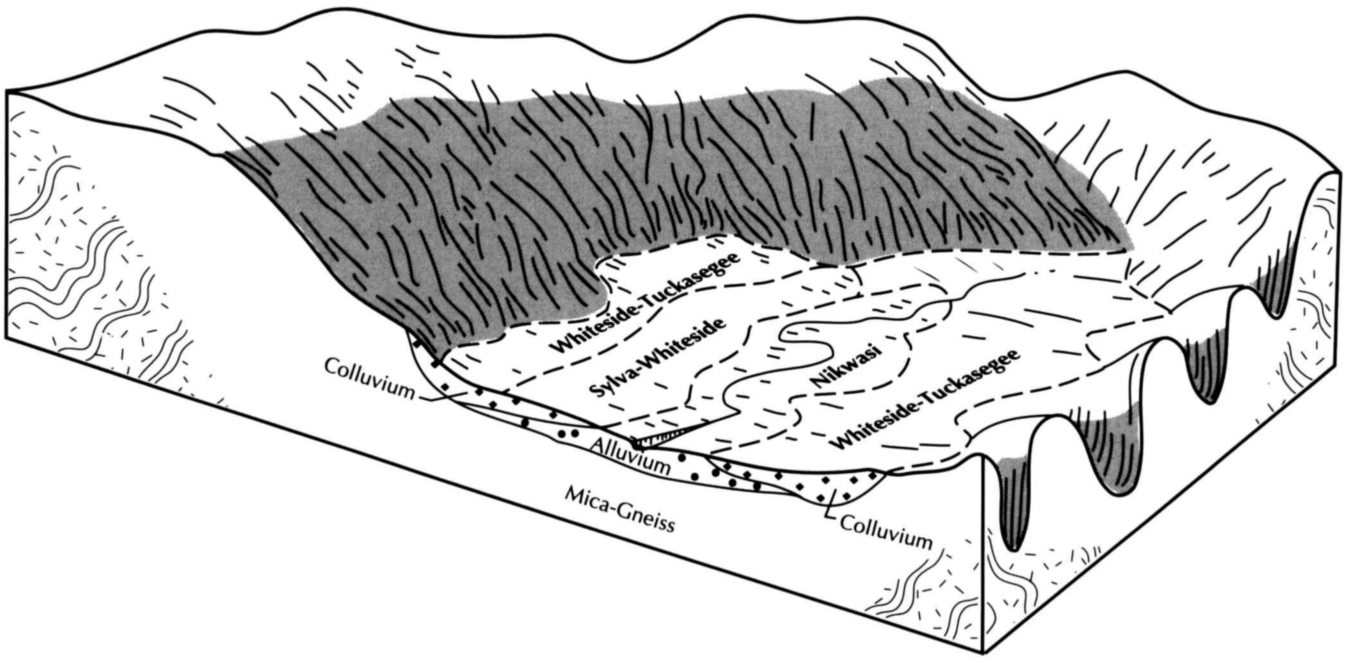

Figure 5.—Relationship of soils and landscape position in the Whiteside-Tuckasegee-Nikwasi general soil map unit.

are the main management concerns in areas of the Nikwasi soils. The slope is the main limitation in areas of the Tuckasegee soils.

5. Wayah

Strongly sloping to very steep, very deep, well drained soils; on uplands in the high mountains

The landscape of this map unit consists of rugged, dissected mountain peaks and side slopes. The peaks of these high mountains are rounded and moderately broad. Slopes range from 8 to 95 percent.

This map unit makes up about 5 percent of the county. It is about 79 percent Wayah soils and 21 percent soils of minor extent. The minor soils include Tanasee and Balsam soils in coves and along drainageways and Burton and Craggey soils near areas of rock outcrop. Small areas of rock outcrop are also included in this map unit.

Wayah soils are very deep and are strongly sloping to very steep. They are on moderately broad, rounded ridgetops and side slopes. Typically, the surface layer is black and very dark grayish brown sandy loam. The subsoil is dark yellowish brown gravelly sandy loam. The underlying material varies in color and has a texture of gravelly sandy loam.

Almost all of the acreage in this map unit is wooded. The dominant trees are northern red oak, black cherry, and sugar maple at elevations below 5,300 feet and red spruce and Fraser fir at elevations above 5,300 feet. A few areas are in natural grass or heath balds. Most of this map unit is owned and managed by the U.S. Forest Service or the National Park Service. The U.S. Forest Service manages timber in areas that are protected from the prevailing wind. Researchers are intensively studying a decrease in the acreage of red spruce and Fraser fir on this map unit. The unit is noted for its great natural beauty and is frequently used for outdoor recreational purposes. The slope and the harsh climate are the main limitations.

A few of the least windy, privately owned areas have been cleared of trees and are used for Christmas trees or as summer pasture. The slope, the hazard of erosion, and the harsh climate are the main management concerns affecting crops and pasture.

Most areas of this map unit are not used for commercial timber because of the harsh climate, which is characterized by high winds and frequent ice storms that severely deform hardwood timber. A few areas that are protected from the wind are used for commercial timber. The slope, the hazard of erosion, and the harsh climate are the main management concerns.

Most of this map unit is federally owned and is used for camping, hiking, fishing, hunting, and sightseeing.

Privately owned areas are being increasingly used for vacation homes and outdoor recreational purposes. The slope and the harsh climate are the main limitations.

Soils That Have a Loamy Surface Layer and Subsoil and Formed in Material Weathered from Metasedimentary Rocks

6. Junaluska-Brasstown-Tsali

Moderately steep to very steep, deep to shallow, well drained soils; on uplands in the low mountains

The landscape of this map unit consists of moderately rugged, dissected low mountains that have long side slopes and very narrow, winding ridgetops and drainageways. Slopes range from 15 to 95 percent. The numerous drainageways join and become creeks, which join the rivers. Streams flow in winding courses through bowl- and finger-shaped coves and narrow drainageways.

This map unit makes up about 2 percent of the county. It is about 55 percent Junaluska soils, 16 percent Brasstown soils, 15 percent Tsali soils, and 14 percent minor soils. The minor soils include Spivey and Santeetlah soils in coves and along drainageways; Dellwood, Cullowhee, and Nikwasi soils along narrow flood plains; and Soco and Stecoah soils along the edge of this map unit at the higher elevations.

Junaluska soils are moderately deep and are moderately steep to very steep. They commonly are on south- to west-facing mountain ridgetops and side slopes. Typically, the surface layer is dark brown channery fine sandy loam. The subsoil is strong brown channery loam and yellowish red channery clay loam. Weathered bedrock is at a depth of 28 inches.

Brasstown soils are deep and are moderately steep and steep. They commonly are on south- to west-facing mountain ridgetops and side slopes. Typically, the surface layer is dark brown channery fine sandy loam. The subsoil is yellowish red and red channery sandy clay loam and channery fine sandy loam. Weathered bedrock is at a depth of 50 inches.

Tsali soils are shallow and are moderately steep to very steep. They commonly are on south- to west-facing, very narrow mountain ridgetops and side slopes. Typically, the surface layer is dark brown channery fine sandy loam. The subsoil is brown and yellowish red channery fine sandy loam or channery loam. Weathered bedrock is at a depth of 16 inches.

Nearly all of the acreage in this map unit is used for commercial timber. A few areas of the minor soils in coves, along drainageways, and on narrow flood plains are cleared of trees and used for pasture or hay. This map unit is also used for outdoor recreational purposes and homesites.

The natural vegetation is mainly hardwoods, such as scarlet oak, chestnut oak, and hickory. Eastern white pine, Virginia pine, and pitch pine are dominant in old fields or pasture that has reverted to woodland. Coves, toe slopes, and drainageways are dominated by yellow-poplar. Logging is difficult in the steep and very steep areas. Building and maintaining access roads are difficult and costly in this map unit. Areas where seams of unstable rocks bearing a large amount of sulfur are unearthed require special treatment. The slope, the depth to weathered bedrock, the hazard of erosion, and the instability of the underlying bedrock are the main limitations affecting woodland management.

Areas of mainly minor soils, such as Santeetlah and Spivey soils in coves and along drainageways and Cullowhee and Dellwood soils along small streams, have been cleared of trees. Most of these areas are used for pasture or hay. The slope and stoniness are the main limitations affecting pasture and hay on Santeetlah and Spivey soils. The flooding and stoniness are the main management concerns affecting pasture and hay on Dellwood soils. The wetness and flooding are the main management concerns affecting pasture and hay on Cullowhee soils.

This map unit is being increasingly used for vacation homes. The slope, the depth to bedrock, the hazard of erosion, and the instability of the underlying bedrock are the main management concerns.

7. Soco-Stecoah-Cheoah

Moderately steep to very steep, moderately deep and deep, well drained soils; on uplands in the intermediate mountains

The landscape of this map unit consists of rugged, dissected mountains that have long side slopes and very narrow, winding ridgetops and drainageways. Slopes range from 15 to 95 percent. The numerous drainageways join and become creeks, which join the rivers. Streams flow in winding courses through bowl- and finger-shaped coves, through narrow flood plains, and through gorges that have small areas of rock outcrop.

This unit makes up about 4 percent of the county. It is about 32 percent Soco soils, 25 percent Stecoah soils, 22 percent Cheoah soils, and 21 percent minor soils. The minor soils include Spivey and Santeetlah soils in coves and along toe slopes and Cullowhee, Nikwasi, and Reddies soils along narrow flood plains. Small areas of rock outcrop are also included in this map unit.

Soco soils are moderately deep and are moderately steep to very steep. They commonly are on south- to west-facing mountain ridgetops and side slopes. Typically, the surface layer is very dark grayish brown channery loam. The subsoil is strong brown, dark yellowish brown, and yellowish brown fine sandy loam and channery fine sandy loam. The underlying material is multicolored channery fine sandy loam. Weathered bedrock is at a depth of 35 inches.

Stecoah soils are deep and are moderately steep to very steep. They commonly are on south- to west-facing ridgetops and side slopes. Typically, the surface layer is very dark grayish brown channery fine sandy loam. The subsoil is dark brown and strong brown fine sandy loam, channery fine sandy loam, and channery sandy loam. Weathered bedrock is at a depth of 45 inches.

Cheoah soils are deep and are steep and very steep. They commonly are on north- to east-facing, shaded or higher ridgetops and side slopes. Typically, the surface layer is very dark grayish brown and dark yellowish brown channery loam. The subsoil is yellowish brown and strong brown channery loam and channery fine sandy loam. The underlying material is multicolored channery fine sandy loam. Weathered bedrock is at a depth of 56 inches.

Most areas of this map unit are used for commercial timber. Recreational uses and homesites are also important. Some of the less sloping areas are cleared of trees and are used as pasture.

The ridgetops and the south- to west-facing slopes are dominated by scarlet oak, chestnut oak, black oak, hickory, and pitch pine. The north- to east-facing slopes are dominated by northern red oak, black cherry, sweet birch, and sugar maple. The coves, toe slopes, and areas along drainageways are dominated by yellow-poplar. Productivity is generally better in the areas that have higher rainfall. The north- to east-facing slopes, coves, toe slopes, and areas along drainageways are preferred for commercial timber production. Logging is difficult in the steep and very steep areas. Building and maintaining access roads are difficult and costly in the steep and very steep areas. Road building also unearths seams of rocks bearing a large amount of sulfur, which are costly to treat and maintain, and the underlying bedrock is unstable. The slope and the hazard of erosion are the major management concerns.

A few of the less sloping areas of the major soils and some areas of the minor soils in this map unit are used for pasture and hay. The slope is the main limitation in the Soco, Stecoah, and Cheoah soils. In the minor soils, stoniness and the slope are the main limitations in areas of Spivey and Santeetlah soils. The flooding and the wetness are the main management concerns in areas of Nikwasi, Cullowhee, and Reddies soils.

Some areas of this map unit that are both federally and privately owned are used for camping, hiking, fishing, hunting, and sightseeing. Privately owned areas are also used for vacation homes. The slope, the depth to weathered bedrock, and the instability of the underlying bedrock are major limitations in most areas.

8. Oconaluftee

Moderately steep to very steep, very deep, well drained soils; on uplands in the high mountains

The landscape of this map unit consists of rugged, dissected mountain peaks and side slopes. The peaks of these high mountains are sharp and narrow. Slopes range from 15 to 95 percent.

This map unit makes up about 1 percent of the county. It is about 80 percent Oconaluftee soils and 20 percent minor soils. The minor soils include Wayah soils along the geologic boundary between metasedimentary rocks and high-grade metamorphic rocks and Cheoah soils at the lower elevations. Small areas of rock outcrop are common in some areas.

Oconaluftee soils are very deep and are moderately steep to very steep. They are on ridgetops and side slopes. Typically, the surface layer is black and dark brown channery loam. The subsoil is dark yellowish brown channery fine sandy loam. The underlying material is multicolored channery fine sandy loam.

Almost all of the acreage in this map unit is wooded. The dominant trees are northern red oak, black cherry, and sugar maple at elevations below 5,300 feet and red spruce and Fraser fir at elevations above 5,300 feet. A few areas are in natural grassy balds or heath balds. Most of this map unit is owned and managed by the National Park Service and the Bureau of Indian Affairs. The Bureau of Indian Affairs manages timber in areas that are protected from the prevailing wind. Researchers are intensively studying a decrease in the acreage of red spruce and Fraser fir on this map unit. The unit is noted for its great natural beauty and is frequently used for outdoor recreational purposes. The slope, the harsh climate, the hazard of erosion, the instability of the underlying rock layers along planes of weakness, and the potential for a high content of sulfur in the underlying bedrock are the main management concerns.

A few of the privately owned areas have been cleared of trees and are used for Christmas trees or as summer pasture. The slope, the hazard of erosion, and the harsh climate are the main management concerns affecting crops and pasture.

Most areas of this map unit are not used for

commercial timber because of the harsh climate, which is characterized by high winds and frequent ice storms that severely deform hardwood timber. A few areas that are protected from the wind are used for commercial timber. The slope restricts the use of logging equipment in many areas. Building and maintaining access roads are difficult and costly because of the climate and the slope. Road building also unearths seams of rocks bearing a large amount of sulfur, which are difficult to treat and maintain. Erosion is a major hazard along logging roads and skid trails.

The federally owned land in this map unit is used for sightseeing, hiking, camping, fishing, and hunting. Privately owned areas are increasingly being used for vacation homes and outdoor recreational purposes. The slope is the major limitation in most areas.

Soils That Have a Loamy Surface Layer and a Clayey Subsoil and Formed in Material Weathered from Ultramafic Rocks

9. Ellijay

Gently sloping to moderately steep, very deep, well drained clayey soils; on uplands in the low mountains

The landscape of this map unit is characterized by moderately broad ridges and short side slopes. Slope ranges from 2 to 30 percent.

This map unit makes up less than 1 percent of the county. It is about 80 percent Ellijay soils and 20 percent minor soils. The minor soils are Braddock soils on high stream terraces and Evard and Cowee soils along the edge of this map unit on the more dissected terrain.

Ellijay soils are very deep and are gently sloping to moderately steep. They are on ridgetops and side slopes. Typically, the surface layer is dusky red silty clay loam. The upper part of the subsoil is dark red clay. The lower part is dark red loam. The underlying material is mottled clay loam and loam.

Most of the gently sloping areas on ridgetops have been cleared of trees and are moderately suited to white pine for use as Christmas trees or as pasture and hayland. The Ellijay soils have a severe calcium-magnesium imbalance in most areas. Calcitic lime needs to be applied to help establish a better nutrient balance. The slope and the hazard of erosion are also management concerns affecting cropland, pasture, or hayland.

Most of the steeper parts of this map unit are wooded or are reverting to woodland, but these areas are poorly suited to commercial timber. The natural vegetation is mainly pine, but hardwoods are dominant in the steeper areas. The vegetation is distinctive and is characterized by stunted Virginia pine, pitch pine, eastern redcedar, and scarlet oak. Trees grow slowly because of the calcium-magnesium imbalance in the major soils and past woodland management practices.

This map unit is increasingly being used for residential homesites. The clayey subsoil may affect septic tank absorption fields. Establishing and maintaining grasses and landscaping plants may be difficult and costly because of the calcium-magnesium imbalance and compaction.

Soils That Have a Very High Content of Mica and a Loamy Surface Layer and Subsoil and Formed in Material Weathered from High-Grade Metamorphic Rocks

10. Chandler-Fannin-Cashiers

Strongly sloping to very steep, very deep, well drained and somewhat excessively drained soils that are very high in content of mica; on uplands in the low and intermediate mountains

The landscape of this map unit consists of moderately broad ridgetops, wide side slopes, and narrow coves (fig. 6). Slopes range from 8 to 95 percent. Numerous drainageways join and become creeks, which join the rivers. Streams flow through bowl- and finger-shaped coves and through narrow flood plains and steep gorges.

This map unit makes up about 12 percent of the county. It is about 42 percent Chandler soils, 21 percent Fannin soils, 17 percent Cashiers soils, and 20 percent minor soils. The minor soils include Dellwood, Nikwasi, and Reddies soils on flood plains; Cullasaja, Tuckasegee, Whiteside, and Sylva soils in coves; and Plott, Edneyville, Chestnut, Evard, Cowee, and Trimont soils in areas that have less mica than the major soils. Small areas of rock outcrop are common.

Chandler soils are somewhat excessively drained, very deep, and strongly sloping to very steep. They commonly are on south- to west-facing ridgetops and side slopes. Typically, the surface layer is very dark grayish brown and dark yellowish brown gravelly fine sandy loam. The subsoil is yellowish brown fine sandy loam. The underlying material is multicolored fine sandy loam.

Fannin soils are well drained, very deep, and strongly sloping to very steep. They commonly are on south- to west-facing ridgetops and side slopes. Typically, the surface layer is very dark grayish brown fine sandy loam. The upper part of the subsoil is strong brown loam. The next part is yellowish red sandy clay loam.

The lower part is yellowish red sandy loam. The underlying material is yellowish red sandy loam.

Cashiers soils are well drained, very deep, and strongly sloping to very steep. They commonly are on higher or shaded, north- to east-facing ridgetops and side slopes. Typically, the surface layer is very dark brown gravelly fine sandy loam. The subsoil is yellowish brown and dark yellowish brown sandy loam or gravelly sandy loam.

Most areas of this map unit are used for commercial timber. Recreational uses are also important. Privately owned areas are used for homesites. The less sloping areas are commonly cleared of trees and are used for hay, pasture, Christmas trees, landscaping plants, cabbage, or broccoli.

Scarlet oak, chestnut oak, eastern white pine, and pitch pine are the dominant trees on the Chandler and Fannin soils. Northern red oak, yellow-poplar, and eastern white pine are the dominant trees on the Cashiers soils. Productivity is generally higher on the Cashiers soils and in the areas that have high rainfall in the southern part of the county. The slope restricts the use of logging equipment in many areas. The hazard of erosion is severe along many logging roads and skid trails. Because of the very high content of mica, logging roads and skid trails are also unstable and very slick during wet periods.

Most areas of this unit that are cleared of trees are in coves, on toe slopes, or on flood plains. The minor Tuckasegee, Cullasaja, and Whiteside soils are the

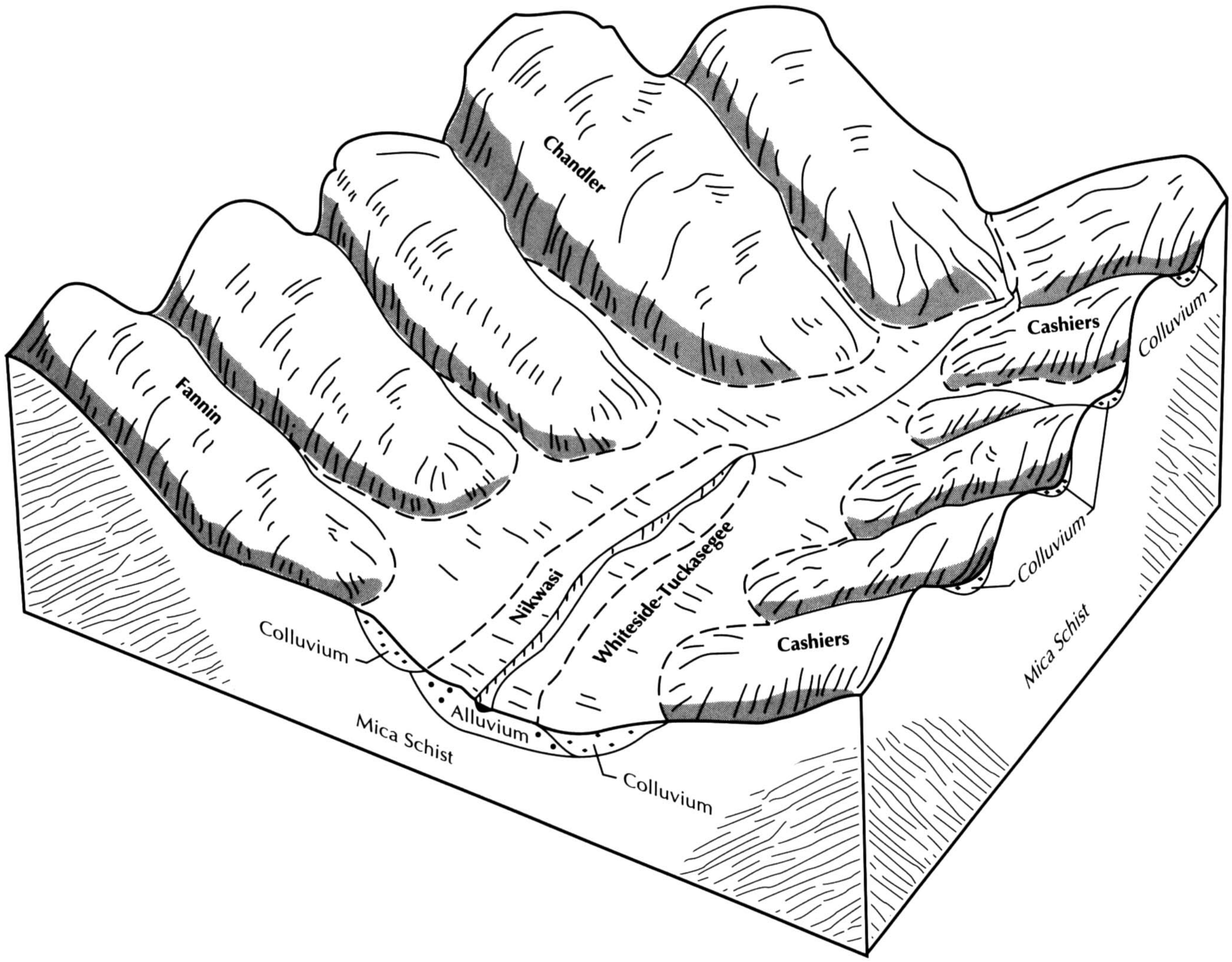

Figure 6.—Relationship of soils, aspect, and parent material in the Chandler-Fannin-Cashiers general soil map unit.

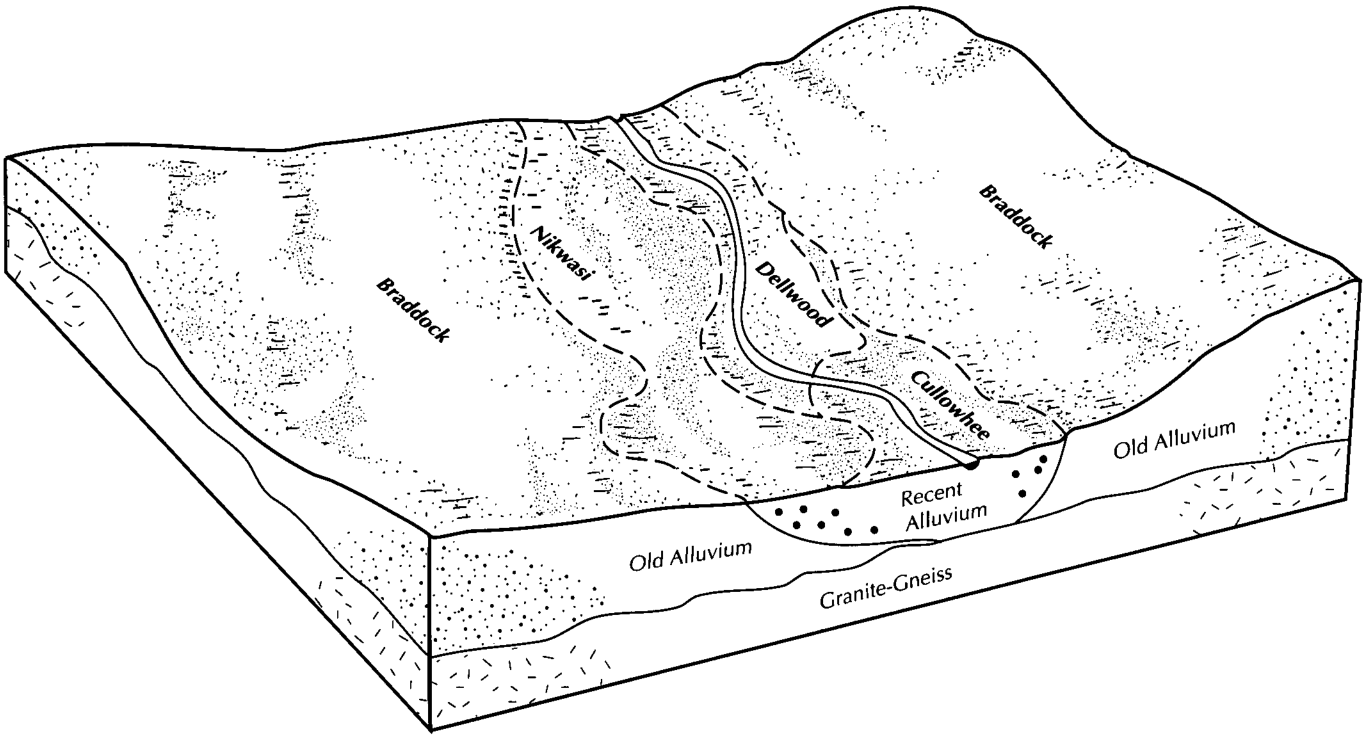

Figure 7.—Relationship of soils and landscape position in the Braddock-Nikwasi-Dellwood-Cullowhee general soil map unit.

main soils used as cropland. They are intensively used for Christmas trees, native ornamentals, ginseng, cabbage, broccoli, pasture, or hay. The slope and the hazard of erosion are the main management concerns affecting crops on Tuckasegee and Whiteside soils. Stoniness is the main limitation affecting crops on Cullasaja soils. Small areas of other minor soils are also used for growing crops. Stoniness and flooding are the main limitations affecting crops on Dellwood soils. Wetness and flooding are the main limitations affecting crops on Nikwasi soils. Wetness is also a limitation affecting crops on Sylva soils. Flooding is the main hazard affecting crops on Reddies soils.

The smoother areas of the major soils in the uplands are also intensively used for Christmas trees, native ornamentals, hay, or pasture. The slope and the severe hazard of erosion are the main management concerns affecting crops and pasture in these areas.

Large areas of this map unit are federally owned and are used for wilderness preservation and camping, hiking, fishing, hunting, and sightseeing. Privately owned areas are being increasingly used for vacation homes and outdoor recreational purposes. The slope, the unstable micaceous parent material, and the severe hazard of erosion are the major management concerns.

Soils That Have a Loamy Surface Layer and a Clayey, Loamy, or Sandy Subsoil and Formed in Old and Recent Alluvium or Colluvium Along the Major Streams

11. Braddock-Nikwasi-Dellwood-Cullowhee

Nearly level to moderately steep, shallow to very deep to strata of sand, gravel, and cobbles, well drained to very poorly drained soils; on high stream terraces, colluvial fans, and flood plains

The landscape of this map unit consists of rolling high stream terraces, colluvial fans, and narrow flood plains along the Tuckasegee River and its major tributaries (fig. 7). Most of these streams are swift and picturesque. Most major roads are parallel to these streams, and most of the year-round population, businesses, and farming operations are in this map unit. Most of this map unit is cleared of trees and is intensively used. Slope ranges from 0 to 30 percent.

This map unit makes up about 3 percent of the county. It is about 32 percent Braddock soils, 11 percent Nikwasi soils, 10 percent Dellwood soils, 10 percent Cullowhee soils, and 37 percent minor soils. The minor soils are Biltmore, Reddies, and Rosman

soils on flood plains; Statler, Dillard, and Hemphill soils on low stream terraces; and Dillsboro soils on high stream terraces.

Braddock soils are well drained, very deep, and gently sloping to moderately steep. These soils are on ridgetops and side slopes on high stream terraces and colluvial fans. Typically, the surface layer is reddish brown clay loam. The upper part of the subsoil is red clay. The lower part is mottled red, yellowish red, and strong brown clay loam.

Nikwasi soils are nearly level, poorly drained and very poorly drained, and moderately deep to strata of sand, gravel, and cobbles. They are on flood plains. Typically, the surface layer is very dark grayish brown and very dark gray fine sandy loam. The underlying material is dark grayish brown and multicolored extremely gravelly coarse sand.

Dellwood soils are nearly level, moderately well drained, and shallow to strata of sand, gravel, and cobbles. They are on flood plains. Typically, the surface layer is dark brown gravelly fine sandy loam and cobbly fine sandy loam. The underlying material is strong brown very cobbly loamy sand.

Cullowhee soils are nearly level, somewhat poorly drained, and moderately deep to strata of sand, gravel, and cobbles. They are on flood plains. Typically, the surface layer is very dark grayish brown, dark brown, and dark yellowish brown fine sandy loam and loamy sand. The underlying material is dark yellowish brown loamy sand, black loamy fine sand, and multicolored extremely gravelly sand.

This map unit is used for variety of crops, such as Fraser fir seedlings, landscaping plants, burley tobacco, strawberries, tomatoes, corn, Christmas trees, hay, and pasture. The flooding and the wetness are the main management concerns affecting crops on the Nikwasi, Dellwood, and Cullowhee soils. The slope and the hazard of erosion are the main management concerns affecting crops on the Braddock soils.

These soils are intensively used for residential and commercial building sites. The flooding and the wetness are the main management concerns on the Nikwasi, Dellwood, and Cullowhee soils. The slope and the hazard of erosion are the main management concerns on the Braddock soils.

The minor soils in this map unit are also intensively used as cropland and as commercial or residential building sites. The flooding and the wetness are the main management concerns affecting these uses on Biltmore, Reddies, Rosman, Dillard, and Hemphill soils. The flooding is the main hazard affecting these uses on Statler soils. The slope and the hazard of erosion are the main management concerns affecting these uses on Dillsboro soils.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of the dominant soils within the map unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under the heading "Use and Management of the Soils."

The map units on the detailed soil maps represent areas on the landscape and consist mainly of the dominant soils for which the units are named.

Symbols identifying the soils precede the map unit names in the map unit descriptions. The descriptions include general facts about the soil and give the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are named as phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Cashiers gravelly fine sandy loam, 50 to 95 percent slopes, is a phase of the Cashiers series.

Some map units are made up of two or more major soils. These map units are called soil complexes.

A *soil complex* consists of two or more contrasting soils, or miscellaneous land areas, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Cullasaja-Tuckasegee complex, 8 to 15 percent slopes, stony, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Pits, quarries, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and suitabilities for many uses. The Glossary defines many of the terms used in describing the soils.

BaA—Biltmore sand, 0 to 3 percent slopes, frequently flooded. This map unit consists mainly of nearly level, very deep, well drained or moderately well drained Biltmore and similar soils on flood plains. Individual areas are on the natural levees along the inside of the curve at the bends of major streams. They range from 2 to 20 acres in size.

The typical sequence, depth, and composition of the layers in the Biltmore soil are as follows—

Surface layer:
0 to 10 inches, dark brown sand

Underlying material:
10 to 27 inches, dark yellowish brown sand
27 to 36 inches, yellowish brown loamy sand
36 to 60 inches, dark yellowish brown sand

Permeability is rapid. Surface runoff is slow. The soil is frequently flooded for brief periods. The seasonal high water table is 3.5 to 6.0 feet below the surface. The depth to hard bedrock is more than 60 inches.

Included in mapping are small areas of Reddies and

Rosman soils. These soils have a loamy surface layer and subsoil. Also, Reddies soils are moderately deep to strata of gravel, cobbles, and sand. They are in areas scoured by floodwater along large stream channels or in areas where the smaller streams cross the unit. Rosman soils are behind Biltmore soils on the inside of the curve of the bends of large streams. Included soils make up about 15 percent of this map unit.

Also included in mapping are some soils that are similar to the Biltmore soil but have a darker surface layer.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for specialty crops, row crops, woodland, or recreational development.

This map unit is moderately suited to pasture and hay. The flooding is the main hazard. Also, the Biltmore soil is droughty because the surface layer and subsoil are sandy. Properly locating watering facilities and stream crossings can help to minimize damage to streambanks and improve water quality downstream.

This map unit is moderately suited to specialty crops. The flooding and droughtiness are the main management concerns. This soil is too sandy for specialty crops that are to be balled and burlapped during harvesting. This soil is preferred for bare-rooted seedling production, however, because seedlings are easily pulled out of the soil without damage to the roots because of the sandy texture. This soil is desirable for specialty crops because it has good access, is near a source of irrigation water, is nearly level, and has good productivity if properly managed. Fraser fir seedlings are grown in most areas (fig. 8). A few areas are used for growing eastern hemlock, rhododendron, and dog hobble. Irrigation is needed to supply additional water, to cool the crop on hot days, and to saturate the soil before harvest. Land shaping helps to smooth the surface and improve the efficiency of irrigation. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is only moderately suited to row crops because of the flooding. Droughtiness and poor air drainage are additional problems. Frost damage to sensitive crops can be significant because of poor air drainage. This soil is commonly used for row crops, however, because it is productive if properly managed. The most common crops are sweet corn, tomatoes, burley tobacco, and strawberries. Nutrients are easily leached from this soil. Split applications of fertilizer are needed for more efficient use by the crop and to control the hazard of ground-water contamination. Irrigation is needed to protect high-value crops. Land shaping helps to smooth the surface and improves the efficiency of irrigation. Vegetative filter strips can improve water quality and provide wildlife habitat. Soil-applied herbicides may be ineffective at normal rates because of the high content of organic matter in the surface layer.

This map unit is well suited to commercial timber. It is seldom used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, pasture, and hayland. The most common trees are yellow-poplar, black cherry, black walnut, American sycamore, pitch pine, shortleaf pine, white oak, eastern white pine, white ash, and Virginia pine.

This map unit is poorly suited to most recreational uses because of the flooding. Because this soil is nearly level and is near streams, however, many areas are used for campsites, parks, picnic areas, ball fields, and tennis courts.

This map unit is poorly suited to building site development because of the flooding. It is rarely used for this purpose.

This map unit is poorly suited to access roads. The flooding is the main hazard. Elevating the roads during construction minimizes the damage caused by flooding.

The capability subclass is IVw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8S.

BkB2—Braddock clay loam, 2 to 8 percent slopes, eroded. This map unit consists mainly of gently sloping, very deep, well drained Braddock and similar soils on high stream terraces. Individual areas are irregular in shape and range from 3 to 20 acres in size.

The typical sequence, depth, and composition of the layers in the Braddock soil are as follows—

Surface layer:
0 to 8 inches, reddish brown clay loam

Subsoil:
8 to 52 inches, red clay
52 to 60 inches, mottled red, yellowish red, and strong brown clay loam

Further erosion is a severe hazard if the surface is bare and unprotected. In these areas, surface runoff is medium. Permeability is moderate. Because of the high content of clay in the surface layer, maintaining good tilth is difficult. A crust may form on the surface layer after rainfall, and clods form if the soil is worked during wet periods. The crust and clods interfere with seed germination.

The seasonal high water table is more than 6 feet below the surface. The depth to bedrock is more than 60 inches. The shrink-swell potential is moderate.

Included in mapping are small areas of Saunook and

Figure 8.—Fraser fir seedlings on Biltmore sand, 0 to 3 percent slopes, frequently flooded.

Dillsboro soils. These soils are not eroded and have a dark surface layer. Saunook soils have a loamy subsoil and are in drainageways. Dillsboro soils are in slight depressions on high stream terraces. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of Braddock soils that have a gravelly surface layer.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, building site development, recreational development, or woodland.

This soil is well suited to pasture and hay, especially alfalfa. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, increases the runoff rate, and reduces the rate of water infiltration. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is moderately suited to crops. The slope, poor tilth, and the severe hazard of erosion are the main management concerns. The most common crops are silage corn, small grain, sweet corn, and strawberries. Irrigation is needed for frost-sensitive crops, such as strawberries. Conservation tillage and crop residue management help to control runoff and

erosion. Grassed field borders, grassed waterways, diversions, contour farming, and crop rotations that include close-growing crops also help to conserve soil and water. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is well suited to specialty crops, such as apples and eastern white pine grown for use as Christmas trees. The slope and the hazard of erosion are management concerns. Establishing and maintaining sod on access roads and in other appropriate areas help to conserve water, minimize erosion, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to building site development. A high content of clay, the moderate shrink-swell potential, and the severe hazard of erosion during construction are management concerns. Permeability is moderate because of a high content of clay in the subsoil. Because of the moderate permeability, enlargement of the absorption area in the septic tank absorption fields may be necessary. The moderate shrink-swell potential can affect foundations in some areas. In many areas around building sites, severe compaction of the soil increases the costs of landscaping.

This map unit is moderately suited to commercial timber. It is seldom used for commercial timber, however, because of the small size of most of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland. It also produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Dillsboro soils. The eroded surface layer is the main management concern. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, yellow-poplar, northern red oak, pitch pine, Virginia pine, and hickory.

This map unit is well suited to outdoor recreational uses, such as campsites and picnic areas. Because this map unit is not near streams and does not have adequate shade, however, it is seldom used for this purpose. The slope and the hazard of erosion are management concerns.

This map unit is poorly suited to access roads because of the high content of clay in the subsoil. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is IIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4C.

BkC2—Braddock clay loam, 8 to 15 percent slopes, eroded. This map unit consists mainly of strongly sloping, very deep, well drained Braddock and similar soils on high stream terraces. Individual areas are irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers in the Braddock soil are as follows—

Surface layer:
0 to 8 inches, reddish brown clay loam

Subsoil:
8 to 52 inches, red clay
52 to 60 inches, mottled red, yellowish red, and strong brown clay loam

Further erosion is a severe hazard if the surface is bare and unprotected. In these areas, surface runoff is rapid. Permeability is moderate. Because of the high content of clay in the surface layer, maintaining good tilth is difficult. A crust may form on the surface layer after rainfall, and clods form if the soil is worked during wet periods. The crust and the clods interfere with seed germination.

The seasonal high water table is more than 6 feet below the surface. The depth to bedrock is more than 60 inches. The shrink-swell potential is moderate.

Included in mapping are small areas of Saunook and Dillsboro soils. These soils are not eroded and have a dark surface layer. Saunook soils have a loamy subsoil and are in drainageways. Dillsboro soils are in slight depressions on high stream terraces. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of soils that are similar to the Braddock soil but have more gravel in the surface layer.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, building site development, recreational development, or woodland.

This soil is well suited to pasture and hay, especially alfalfa. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes compaction, increases the runoff rate, and reduces the rate of water infiltration. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to crops. The slope, the severe hazard of erosion, and poor tilth are the main management concerns. The most common crops are silage corn, small grain, sweet corn, and strawberries. Irrigation is needed for some high-value

crops, such as strawberries. Conservation tillage and crop residue management help to control runoff and erosion. Grassed field borders, grassed waterways, diversions, contour farming, and crop rotations that include close-growing crops also help to conserve soil and water. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to specialty crops, such as eastern white pine grown for use as Christmas trees. The slope and the severe hazard of erosion are management concerns. Establishing and maintaining sod on access roads and in other appropriate areas help to conserve water, minimize erosion, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to building site development. The slope, a high content of clay, and the severe hazard of erosion during construction are management concerns. Permeability is moderate because of a high content of clay in the subsoil. Because of the moderate permeability, enlargement of the absorption area in the septic tank absorption fields may be necessary. The moderate shrink-swell potential can affect foundations in some areas. In many areas around building sites, severe compaction increases the costs of landscaping.

This map unit is moderately suited to commercial timber. It is seldom used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland. It also produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Dillsboro soils. The eroded surface layer is the main management concern. The most common trees include scarlet oak, chestnut oak, black oak, white oak, eastern white pine, yellow-poplar, northern red oak, pitch pine, Virginia pine, and hickory.

This map unit is moderately suited to outdoor recreational uses, such as campsites, picnic areas, and hiking trails. Because this map unit is not near streams and does not have adequate shade, however, it is seldom used for campsites or picnic areas. The slope and the severe hazard of erosion are also management concerns.

This map unit is poorly suited to access roads. The slope and the high content of clay in the subsoil are management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is IVe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4C.

BkD2—Braddock clay loam, 15 to 30 percent slopes, eroded. This map unit consists mainly of moderately steep, very deep, well drained Braddock and similar soils on high stream terraces or colluvial fans. Individual areas are irregular in shape and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers in the Braddock soil are as follows—

Surface layer:
0 to 8 inches, reddish brown clay loam

Subsoil:
8 to 52 inches, red clay
52 to 60 inches, mottled red, yellowish red, and strong brown clay loam

Further erosion is a severe hazard if the surface is bare and unprotected. In these areas, surface runoff is rapid. Permeability is moderate. Because of the high clay content in the surface layer, maintaining good tilth is difficult. A crust may form on the surface layer after rainfall, and clods form if the soil is worked during wet periods. The crust and the clods interfere with seed germination. Operating farm equipment on this soil is difficult.

The seasonal high water table is more than 6 feet below the surface. The depth to bedrock is more than 60 inches. The shrink-swell potential is moderate.

Included in mapping are small areas of Cowee, Evard, and Saunook soils. These soils are not eroded and have a loamy subsoil. Saunook soils have a dark surface layer and are in drainageways. Cowee and Evard soils formed in saprolite on the adjacent uplands. Also, Cowee soils are moderately deep to weathered bedrock. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of soils that are similar to the Braddock soil but have more gravel in the surface layer.

Much of the acreage in this map unit is used as pasture and hayland. Some areas are used for specialty crops, building site development, recreational development, or woodland.

This soil is moderately suited to pasture and hay, especially alfalfa. The slope, soil compaction, and the severe hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes

compaction, increases the runoff rate, and reduces the rate of water infiltration.

This map unit is poorly suited to row crops. The slope, the severe hazard of erosion, and poor tilth are the main management concerns.

This map unit is poorly suited to specialty crops, such as eastern white pine grown for use as Christmas trees. The slope and the severe hazard of erosion are management concerns. Establishing and maintaining sod on access roads and in other appropriate areas help to conserve water, minimize erosion, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. In many areas, however, it is commonly used for this purpose. The slope, a high content of clay, the moderate shrink-swell potential, and the severe hazard of erosion during construction are management concerns. Permeability is moderate because of a high content of clay in the subsoil. Because of the moderate permeability, enlargement of the absorption area in the septic tank absorption fields may be necessary. The moderate shrink-swell potential can affect foundations in some areas. In many areas around building sites, severe compaction increases the costs of landscaping.

This map unit is moderately suited to commercial timber. It is seldom used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from pasture, hayland, building sites, or specialty crops. It also produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Dillsboro soils. The slope and the eroded surface layer are the main management concerns. The most common trees include scarlet oak, chestnut oak, black oak, white oak, eastern white pine, yellow-poplar, northern red oak, pitch pine, Virginia pine, and hickory.

This map unit is poorly suited to outdoor recreational uses, such as campsites, picnic areas, and hiking trails. The slope and the severe hazard of erosion are management concerns. The hiking trails are very slick and soft during wet periods.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion during construction, and the high content of clay in the subsoil are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

BrC—Braddock-Urban land complex, 2 to 15 percent slopes. This map unit consists mainly of very deep, gently sloping and strongly sloping, well drained Braddock and similar soils and areas of Urban land. The unit is on high stream terraces. Most of the unit is near the Tuckasegee River, especially near the towns of Whittier, Sylva, and Dillsboro and in the Cullowhee community. The unit is about 50 percent Braddock and similar soils, 35 percent Urban land, and 15 percent included soils. The Braddock soil and Urban land occur as areas too intricately mixed to be mapped separately. Most areas are irregular in shape and range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in the Braddock soil are as follows—

Surface layer:
0 to 8 inches, reddish brown clay loam
8 to 52 inches, red clay

Subsoil:
52 to 60 inches, mottled red, yellowish red, and strong brown clay loam

Urban land consists of areas where the original soils have been cut, filled, graded, or paved. Soil properties have been so altered that a soil series is not recognized. These areas are used for buildings, streets, parking lots, or other uses where buildings are closely spaced or the soils are covered with pavement. The extent of site modification varies greatly.

Included in mapping are small areas of Dillsboro and Saunook soils. These soils are not eroded and have a dark surface layer. Saunook soils have a loamy subsoil. They are in drainageways. Dillsboro soils are in slight depressions. Included soils make up about 15 percent of this unit.

The rate of surface runoff in areas of this map unit is higher than that on other Braddock soils because most areas are covered by buildings, streets, parking lots, and other impermeable materials. During periods of heavy rainfall, the runoff is difficult to control and is concentrated in concave areas. The hazard of erosion can be severe during and immediately after construction if the surface is bare and unprotected. Permeability is moderate because of a high content of clay in the subsoil. Because of the moderate permeability, enlargement of the absorption area in septic tank absorption fields may be necessary.

Landscaping problems are common on the Braddock soil. This soil generally was eroded before urbanization, and the surface layer has a high content of clay and poor physical properties. In many areas compaction of the soil further adds to the problems of landscaping. Crusting and clodding commonly interfere with seed

germination and increase the costs of landscaping.

The capability subclass is IVe in areas of the Braddock soil and VIIIs in areas of Urban land. This unit has not been assigned a woodland ordination symbol.

BuD—Burton-Craggey-Rock outcrop complex, windswept, 8 to 30 percent slopes, stony. This map unit occurs mainly as areas of a moderately deep, well drained Burton soil; a shallow, somewhat excessively drained Craggey soil; and areas of Rock outcrop. The unit is on sloping to moderately steep ridgetops in the high mountains. Individual areas are long and narrow and range from 5 to 40 acres in size. Typically, they are 35 to 45 percent Burton soil, 25 to 35 percent Craggey soil, and 10 to 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Burton soil are as follows—

Surface layer:
0 to 12 inches, very dark gray and very dark grayish brown cobbly sandy loam

Subsoil:
12 to 22 inches, brownish yellow cobbly sandy loam

Weathered bedrock:
22 to 36 inches, weathered, high-grade metamorphic bedrock

Hard bedrock:
36 inches, hard, high-grade metamorphic bedrock

The typical sequence, depth, and composition of the layers in the Craggey soil are as follows—

Surface layer:
0 to 16 inches, black, very dark gray, and dark brown cobbly sandy loam

Hard bedrock:
16 inches, hard, high-grade metamorphic bedrock

Permeability is moderately rapid in the Burton and Craggey soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The hazard of erosion is severe when the soils are unvegetated. The climate is severe. Winter is cold, icy, and very windy, and the rest of the year is rainy, foggy, and cool. The Burton and Craggey soils are frozen for long periods in the winter.

Included in mapping are small areas of Wayah soils. These soils are very deep to hard bedrock. Also included are small areas of seeps around the areas of Rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Burton and Craggey soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or on shoulder slopes on the ridges. Where the surface layer is more than 20 inches thick, the soils are in saddles.

Most of the acreage in this map unit is wooded and is on U.S. Forest Service lands, on National Park Service lands along the Blue Ridge Parkway, or on the Cherokee Indian Reservation. A few areas are in grassy balds or heath balds. Most areas of federally owned land are used for recreational purposes. Some of the privately owned lands are used for building site development.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The depth to hard bedrock, limited access, and a severe hazard of erosion also are management concerns. Northern red oak is the most common tree. Other trees include sweet birch and yellow birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to recreational facilities that require onsite sewage disposal. The depth to bedrock, limited access, and the severe hazard of erosion are the main management concerns. Many areas have scenic vistas, especially along the Blue Ridge Parkway, and commonly are used for overlooks and hiking trails. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is poorly suited to building site development. Limited access, the depth to bedrock, the severe hazard of erosion, and the cold, windy winters are management concerns. The building sites are used mainly for summer homes. The depth to which the soil freezes and the depth to bedrock limit the use of this unit for septic tank absorption fields. The hazard of ground-water contamination or stream pollution is severe. Access is very difficult in winter. Revegetating disturbed areas is difficult because of the slope, the scarcity of soil material, and freezing and thawing in spring and fall. Excavation for dwellings with basements is hampered by the depth to bedrock.

This map unit is poorly suited to access roads. The depth to hard bedrock and the slope are the main limitations. Freezing and thawing in spring and fall and

frequent ice storms in winter increase the costs of maintaining the roads. Drilling and blasting of the hard bedrock are commonly needed. Because unsurfaced roads are slick when wet, they should be surfaced for year-round use. Revegetating areas that have been cut and filled is difficult because of the slope, the scarcity of soil material, and freezing and thawing in spring and fall. Building the roadbed on the natural soil, where possible, minimizes slumping.

This map unit is unsuited to crops, pasture, or hayland. The slope, the depth to bedrock, difficult access across the steep terrain, the cold climate, stoniness, and the severe hazard of erosion are management concerns.

The capability subclass is VIs in areas of the Burton soil, VIIs in areas of the Craggey soil, and VIIIs in areas of the Rock outcrop. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R in areas of the Burton soil and 2D in areas of the Craggey soil. The Rock outcrop has not been assigned a woodland ordination symbol.

BuF—Burton-Craggey-Rock outcrop complex, windswept, 30 to 95 percent slopes, stony. This map unit occurs mainly as areas of a moderately deep, well drained Burton soil; a shallow, somewhat excessively drained Craggey soil; and areas of Rock outcrop. The unit is on steep and very steep head slopes and side slopes in the high mountains. In most areas crossing the landscape is dangerous. Individual areas are irregular in shape and range from 10 to 80 acres in size. Typically, they are 35 to 45 percent Burton soil, 25 to 35 percent Craggey soil, and 10 to 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Burton soil are as follows—

Surface layer:
0 to 12 inches, very dark gray and very dark grayish brown cobbly sandy loam

Subsoil:
12 to 22 inches, brownish yellow cobbly sandy loam

Weathered bedrock:
22 to 36 inches, weathered, high-grade metamorphic bedrock

Hard bedrock:
36 inches, hard, high-grade metamorphic bedrock

The typical sequence, depth, and composition of the layers in the Craggey soil are as follows—

Surface layer:
0 to 16 inches, black, very dark gray, and dark brown cobbly sandy loam

Hard bedrock:
16 inches, hard, high-grade metamorphic bedrock

Permeability is moderately rapid in the Burton and Craggey soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The hazard of erosion is severe when the soils are unvegetated. The climate is severe. Winter is cold, icy, and very windy, and the rest of the year is rainy, foggy, and cool. The Burton and Craggey soils are frozen for long periods in the winter. Landslides are common during prolonged periods of heavy rainfall.

Included in mapping are small areas of Balsam, Tanasee, and Wayah soils. These soils are very deep to bedrock. Balsam and Tanasee soils are intermingled with areas of the Burton and Craggey soils in coves and gaps, and Wayah soils are in saddles. Balsam soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of seeps around the areas of Rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Burton and Craggey soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles or on the lower side slopes.

Most of the acreage of this map unit is wooded and is on U.S. Forest Service lands, on National Park Service lands along the Blue Ridge Parkway, or on the Cherokee Indian Reservation. A few areas are in grassy balds or heath balds. Most areas of federally owned land are used for recreational purposes.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the depth to hard bedrock, limited access, and a severe hazard of erosion are also management concerns. Northern red oak is the most common tree. Other trees include sweet birch and yellow birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to recreational facilities that require onsite sewage disposal. The slope, the

depth to bedrock, and the severe hazard of erosion are management concerns. Many areas have scenic vistas, especially along the Blue Ridge Parkway, and commonly are used for overlooks and hiking trails. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to building site development, crops, and pasture. The slope, the depth to bedrock, the cold climate, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and the depth to hard bedrock are the main limitations. Freezing and thawing in spring and fall and frequent ice storms in winter increase the costs of maintaining the roads. Drilling and blasting of the hard bedrock are commonly needed. Because unsurfaced roads are slick when wet, they should be surfaced for year-round use. Revegetating large areas that have been cut and filled is difficult because of the slope, the scarcity of soil material, and freezing and thawing in spring and fall. Building the roadbed on the natural soil, where possible, minimizes slumping.

The capability subclass is VIIs in areas of the Burton and Craggey soils and VIIIs in areas of Rock outcrop. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R. The Rock outcrop has not been assigned a woodland ordination symbol.

CaC—Cashiers gravelly fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Cashiers and similar soils on north-trending ridgetops or ridgetops shaded by the higher mountains, predominantly in the intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Cashiers soil are as follows—

Surface layer:

0 to 9 inches, very dark brown gravelly fine sandy loam

Subsoil:

9 to 48 inches, yellowish brown and dark yellowish brown sandy loam

48 to 65 inches, dark yellowish brown gravelly sandy loam

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible.

Included in mapping are small areas of Chandler and Fannin soils. These soils are generally on south- to west-facing ridgetops. They have a surface layer that is thinner or lighter colored than that of the Cashiers soil. Also, Fannin soils have more clay in the subsoil. Included soils make up about 15 percent of this unit.

Also included in mapping are soils that are similar to the Cashiers soil but have a dark surface layer that is more than 10 inches thick or have a redder subsoil.

Much of the acreage in this map unit is wooded. Some areas are used for specialty crops, pasture, hayland, building site development, or recreational development.

This map unit is well suited to commercial timber. The productivity of commercial species is high. The high productivity helps to compensate for management concerns, such as the slope and plant competition. The most common trees are eastern white pine, yellow-poplar, northern red oak, black cherry, sweet birch, yellow buckeye, American beech, white ash, red maple, and eastern hemlock.

Hardwoods should be preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine commonly is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the content of organic matter in the surface layer and the very high content of mica.

This map unit is well suited to specialty crops, such as landscaping plants and Christmas trees. The slope and the severe hazard of erosion are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to

control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is well suited to pasture and hayland. Cool-season grasses, such as tall fescue and orchardgrass, grow well. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is only moderately suited to building site development because of the slope, the severe hazard of erosion, and the instability of the underlying saprolite. Cold temperatures in winter also reduce the potential for year-round homes. Caving of cutbanks is a hazard in excavated areas because of the high content of mica in the underlying saprolite. Revegetating disturbed areas is difficult because of the slope and the instability of the underlying saprolite.

This map unit is only moderately suited to recreational uses, such as hiking trails and campsites, because of the slope and the severe hazard of erosion. The trails are very slick during wet periods. Because this soil commonly is on ridgetops, campsites that have a convenient source of water are scarce.

This map unit is poorly suited to cropland because of the slope and the severe hazard of erosion.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil are the main management concerns. Revegetating the areas that have been cut and filled is difficult. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is IVe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7A.

CaD—Cashiers gravelly fine sandy loam, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Cashiers and similar soils on north- to east-facing side slopes and north-trending ridgetops, predominantly in the intermediate mountains. Individual areas are long and narrow and range from 5 to 60 acres in size.

The typical sequence, depth, and composition of the layers in the Cashiers soil are as follows—

Surface layer:

0 to 9 inches, very dark brown gravelly fine sandy loam

Subsoil:

9 to 48 inches, yellowish brown and dark yellowish brown sandy loam

48 to 65 inches, dark yellowish brown gravelly sandy loam

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. Because of the slope, operating farm equipment on this soil is difficult.

Included in mapping are small areas of Chandler and Fannin soils. These soils are generally on south- to west-facing side slopes and ridgetops. They have a surface layer that is thinner or lighter colored than that of the Cashiers soil. Also, Fannin soils have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cashiers soil but have a dark surface layer that is more than 10 inches thick or have a redder subsoil.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for specialty crops, building site development, or recreational development.

This map unit is moderately suited to commercial timber. The productivity of commercial species is high. The high productivity helps to compensate for management concerns, such as the slope, plant competition, and a moderate hazard of erosion. The most common trees are eastern white pine, yellow-poplar, northern red oak, black cherry, sweet birch, yellow buckeye, American beech, white ash, red maple, and eastern hemlock.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine commonly is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide

increases the seedling survival rate, controls plant competition, minimizes the amount of debris, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope, a high organic matter content, and the very high content of mica.

This map unit is only moderately suited to pasture and hay because of the slope and the severe hazard of erosion. Cool-season grasses, such as tall fescue and orchardgrass, grow well. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is only moderately suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope and the severe hazard of erosion. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, the severe hazard of erosion, and the instability of the underlying saprolite. Cold temperatures in winter also reduce the potential for year-round homes. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the underlying saprolite. Revegetating disturbed areas is difficult because of the slope and the severe hazard of erosion.

The map unit is only moderately suited to outdoor recreational uses, such as hiking trails, because of the slope and the severe hazard of erosion. The trails are very slick during wet periods.

This map unit is poorly suited to crops because of the slope and the severe hazard of erosion.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil. Revegetating the areas that have been cut and filled is difficult. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7R.

CaE—Cashiers gravelly fine sandy loam, 30 to 50 percent slopes. This map unit consists mainly of steep, very deep, well drained Cashiers and similar soils on north- to east-facing head slopes, side slopes, and ridgetops in the low and intermediate mountains. Individual areas are irregular in shape and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers in the Cashiers soil are as follows—

Surface layer:
- 0 to 9 inches, very dark brown gravelly fine sandy loam

Subsoil:
- 9 to 48 inches, yellowish brown and dark yellowish brown sandy loam
- 48 to 65 inches, dark yellowish brown gravelly sandy loam

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible.

Included in mapping are small areas of Chandler and Fannin soils. These soils are generally on south- to west-facing side slopes. They have a surface layer that is thinner or lighter colored than that of the Cashiers soil. Also, Fannin soils have more clay in the subsoil. Included soils make up about 15 percent of this unit.

Also included in mapping are soils that are similar to the Cashiers soil but have a dark surface layer that is more than 10 inches thick or have a redder subsoil.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for specialty crops, building site development, or recreational development.

This map unit is poorly suited to commercial timber. The slope and the severe hazard of erosion are the main management concerns. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for the management concerns. The most common trees are eastern white pine, yellow-poplar, northern red oak, black cherry, sweet birch, yellow

buckeye, American beech, white ash, red maple, and eastern hemlock.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine commonly is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope, the content of organic matter in the surface layer, and the very high content of mica.

This map unit is poorly suited to pasture because of the slope and the very severe hazard of erosion. Operating farm equipment is dangerous on this soil. Most farming operations are done by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope and the very severe hazard of erosion. Operating farm equipment is dangerous on this soil. Most farming operations are done by hand. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is unsuited to hayland or row crops because of the slope and the very severe hazard of erosion.

This map unit is poorly suited to building site development because of the slope, the very severe hazard of erosion, and the instability of the underlying saprolite. Cold temperatures in winter increase the costs of utilities and maintenance and reduce the potential for year-round homes. Because the slopes are too steep to operate equipment safely, septic tank absorption fields generally should be dug by hand. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the underlying saprolite. Revegetating disturbed areas is difficult because of the slope and the very severe hazard of erosion. Establishing vegetation is needed to help control erosion. Hydroseeding is an excellent way to establish vegetation in steep, bare areas.

This soil is poorly suited to recreational uses, such as hiking trails. The slope and the very severe hazard of erosion are management concerns. The trails are very slick during wet periods.

This soil is poorly suited to access roads. The slope, the very severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil are the main management concerns. Revegetating large areas that have been cut and filled is very difficult. Hydroseeding is a good way to revegetate steep, bare areas. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7R.

CaF—Cashiers gravelly fine sandy loam, 50 to 95 percent slopes. This map unit consists mainly of very steep, very deep, well drained Cashiers and similar soils on north- to east-facing head slopes and side slopes, predominantly in the intermediate mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Cashiers soil are as follows—

Surface layer:

0 to 9 inches, very dark brown gravelly fine sandy loam

Subsoil:

9 to 48 inches, yellowish brown and dark yellowish brown sandy loam

48 to 65 inches, dark yellowish brown gravelly sandy loam

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible.

Included in mapping are small areas of Chandler and Fannin soils. These soils are generally on south- to west-facing side slopes. They have a surface layer that is thinner and lighter colored than that of the Cashiers soil. Also, Fannin soils have more clay in the subsoil. Included soils make up about 15 percent of this unit.

Also included in mapping are soils that are similar to the Cashiers soil but have a dark surface layer that is more than 10 inches thick or have a redder subsoil.

Nearly all of the acreage in this map unit is used for commercial timber. A few areas are used for outdoor recreational purposes, such as hiking trails.

This map unit is poorly suited to commercial timber. The slope and the severe hazard of erosion are the main management concerns. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for the management concerns. The most common trees are eastern white pine, yellow-poplar, northern red oak, black cherry, sweet birch, yellow buckeye, American beech, white ash, red maple, and eastern hemlock.

Hardwoods commonly are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine commonly is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris, and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the kind of equipment that can be used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this soil. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to recreational uses because of the slope and the severe hazard of erosion. A few areas are used for hiking trails. The trails are very slick during wet periods.

This map unit is poorly suited to pasture, building site development, and crops. The slope, the severe hazard of erosion, and the cold winter weather are management concerns.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil. Revegetating large areas that have been cut and filled is very difficult. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7R.

CdC—Chandler gravelly fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, somewhat excessively drained Chandler and similar soils on ridgetops in the low and intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Chandler soil are as follows—

Surface layer:

0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:

7 to 25 inches, yellowish brown fine sandy loam

Underlying material:

25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity.

Included in mapping are small areas of Cashiers and

Fannin soils. Cashiers soils are on north- to east-facing ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This map unit is well suited to commercial timber. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. This soil produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The most common trees are scarlet oak, chestnut oak, northern red oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, shortleaf pine, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the very high content of mica.

This map unit is well suited to pasture and hay. The slope, the severe hazard of erosion, and difficult access across the steep terrain are management concerns. Cool-season grasses grow well because they are dormant in the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is only moderately suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope, the severe hazard of erosion, and difficult access across the steep terrain. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to building site development. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to seed steep, bare areas.

This map unit is moderately suited to some recreational uses, such as hiking trails and campsites. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing increase the need for trails to be properly maintained. Because this map unit is on ridgetops, campsites that have a convenient source of water are scarce.

This map unit is poorly suited to row crops because of the slope, the severe hazard of erosion, and droughtiness.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is IVe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4A.

CdD—Chandler gravelly fine sandy loam, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes and narrow ridgetops in the low and intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Chandler soil are as follows—

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils are on north- to east-facing side slopes or ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This map unit is moderately suited to commercial timber. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. This soil produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The most common trees are scarlet oak, chestnut oak, northern red oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, shortleaf pine, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the very high content of mica.

This map unit is moderately suited to pasture and hay. The slope, difficult access across the steep terrain, and the severe hazard of erosion are management concerns. Operating farm equipment is difficult because of the slope. Cool-season grasses grow well because they are dormant during the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is only moderately suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope, the severe hazard of erosion, and difficult access across the steep terrain. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Operating farm equipment is difficult because of the slope. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness.

This map unit is moderately suited to some recreational uses, such as hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods.

The slope and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops because of the slope, droughtiness, and the severe hazard of erosion.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4R.

CdE—Chandler gravelly fine sandy loam, 30 to 50 percent slopes. The map unit consists mainly of steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes and ridgetops in the low and intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers in the Chandler soil are as follows—

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity. Operating farm equipment is dangerous on this soil. All farming operations are done by hand.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils are on north- to east-facing side slopes or ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for specialty crops, building site development, or recreational development.

This map unit is poorly suited to commercial timber. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are the main management concerns. This soil produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The most common trees are scarlet oak, chestnut oak, northern red oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, shortleaf pine, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the slope and the very high content of mica.

This map unit is poorly suited to pasture and hay. The slope and the severe hazard of erosion are the main management concerns. Cool-season grasses grow well because they are dormant in the droughty summer

months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition conserves soil and water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope and the severe hazard of erosion. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. Septic tank absorption fields commonly are dug by hand because of the slope. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to revegetate steep areas that have been cut and filled.

This map unit is poorly suited to most recreational uses. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. The slope and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to row crops. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil. Revegetating and maintaining large areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4R.

CdF—Chandler gravelly fine sandy loam, 50 to 95 percent slopes. This map unit consists mainly of very steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes in the low and intermediate mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Chandler soil are as follows—

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils have a dark surface layer that is thicker than that of the Chandler soil. They are on north- to east-facing side slopes. Fannin soils are redder in color than the Chandler soil. They have more clay in the subsoil. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor recreational development.

This map unit is poorly suited to commercial timber. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. This soil produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The most common trees are scarlet oak, chestnut oak, northern red oak, black oak, white oak, yellow-poplar, eastern white pine, pitch

pine, Virginia pine, hickory, shortleaf pine, and black locust.

Hardwoods should be preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to nearly all recreational uses. A few areas are used for hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, hayland, building site development, and cropland. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the very severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil are management concerns. Revegetating and maintaining large areas that have been cut and filled are very difficult. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4R.

CeC—Chandler gravelly fine sandy loam, 8 to 15 percent slopes, windswept. This map unit consists mainly of strongly sloping, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing ridgetops in the low and intermediate mountains. Individual areas are long and narrow and range from 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers in the Chandler soil are as follows—

Surface layer:

0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:

7 to 25 inches, yellowish brown fine sandy loam

Underlying material:

25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils are on north- to east-facing ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for specialty crops, recreational development, or building site development.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the instability of the underlying saprolite, and the severe hazard of erosion also are management concerns. The most common trees are

scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, and black locust.

This map unit is well suited to pasture and hay. The severe hazard of erosion and difficult access across the steep terrain are management concerns. Cool-season grasses grow well because they are dormant in the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Livestock shelters are needed during the winter. Keeping the pasture in good condition conserves soil and water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees, mainly because of the harsh climate. Specialty crops need protection from strong winds in the winter. The slope, the severe hazard of erosion, and difficult access across the steep terrain also are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, the instability of the underlying saprolite, and the severe hazard of erosion. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to revegetate steep, bare areas.

This map unit is moderately suited to recreational uses, such as hiking trails and campsites. The slope, the harsh climate, and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained. Because this map unit is on ridges, campsites that have a convenient source of water are scarce.

This map unit is poorly suited to row crops because of the slope, the severe hazard of erosion, difficult access across the steep terrain, and droughtiness.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep, bare areas. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is IVe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2A.

CeD—Chandler gravelly fine sandy loam, 15 to 30 percent slopes, windswept. This map unit consists mainly of moderately steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes and ridgetops in the low and intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers in the Chandler soil are as follows—

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity. Operating farm equipment is difficult on this soil.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils are on north- to east-facing side slopes or ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This soil is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the instability of the underlying saprolite, and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, and black locust.

This map unit is only moderately suited to pasture and hay because of the slope, difficult access across the steep terrain, and the severe hazard of erosion. Cool-season grasses grow well because they are dormant during the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope, difficult access across the steep terrain, the severe hazard of erosion, and the harsh climate are management concerns. Specialty crops need protection from strong winds in the winter. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, difficult access across the steep terrain, the instability of the underlying saprolite, and the severe hazard of erosion. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness.

This map unit is moderately suited to recreational uses, such as hiking trails. The slope, the harsh climate, and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops because of the slope, difficult access across the steep terrain, and the severe hazard of erosion.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2R.

CeE—Chandler gravelly fine sandy loam, 30 to 50 percent slopes, windswept. This map unit consists mainly of steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes and ridgetops in the low and intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers in the Chandler soil are as follows—

Surface layer:
0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:
7 to 25 inches, yellowish brown fine sandy loam

Underlying material:
25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soils and increases productivity. Operating farm equipment is dangerous on this soil.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils are on north- to east-facing side slopes or ridgetops and have a dark surface layer that is thicker than that of the Chandler soil. Fannin soils are redder than the Chandler soil. They have more

clay in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more stones on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for specialty crops, building site development, or recreational development.

This soil is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the instability of the underlying saprolite, and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, pitch pine, Virginia pine, hickory, and black locust.

This map unit is poorly suited to pasture and hayland because of the slope and the severe hazard of erosion. Cool-season grasses grow well because they are dormant in the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition conserves soil and water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope, the harsh climate, and the severe hazard of erosion are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Landscaping plants and Christmas trees need protection from strong winds in winter. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, the instability of the underlying saprolite, the severe hazard of erosion, and the harsh climate. Septic tank absorption fields commonly are dug by hand because of the slope. Caving of cutbanks is a hazard in excavated areas because of the very high content of mica in the saprolite. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness.

This map unit is poorly suited to recreational uses. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to row crops because of the severe hazard of erosion, the slope, and the harsh climate.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are management concerns. Revegetating and maintaining large areas that have been cut and filled are difficult. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2R.

CeF—Chandler gravelly fine sandy loam, 50 to 95 percent slopes, windswept. This map unit consists mainly of very steep, very deep, somewhat excessively drained Chandler and similar soils on south- to west-facing side slopes in the low and intermediate mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Chandler soil are as follows—

Surface layer:

0 to 7 inches, very dark grayish brown and dark yellowish brown gravelly fine sandy loam

Subsoil:

7 to 25 inches, yellowish brown fine sandy loam

Underlying material:

25 to 99 inches, multicolored fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall compensates for the droughtiness of the soil and increases productivity.

Included in mapping are small areas of Cashiers and Fannin soils. Cashiers soils have a dark surface layer that is thicker than that of the Chandler soil. They are

on north- to east-facing side slopes. Fannin soils are redder in color than the Chandler soil. They have more clay in the subsoil. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chandler soil but have a redder subsoil or more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor recreational purposes.

This soil is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the instability of the underlying saprolite, and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, and black locust.

This map unit is poorly suited to outdoor recreational uses because of the slope, the harsh climate, and the severe hazard of erosion. A few areas are used for hiking trails. The trails are very slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, hayland, building site development, and crops. The slope, the harsh climate, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads because of the slope, the severe hazard of erosion, the instability of the underlying saprolite, and difficulty in compacting the soil. Revegetating and maintaining large areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Because of the very high content of mica, compacting fill material is very difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2R.

ChE—Cheoah channery loam, 30 to 50 percent slopes. This map unit consists mainly of steep, deep, well drained Cheoah and similar soils on side slopes and ridgetops in the intermediate mountains. They are on north- to east-facing side slopes or on slopes shaded by the higher mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Cheoah soil are as follows—

Surface layer:

0 to 15 inches, very dark grayish brown and dark yellowish brown channery loam

Subsoil:

15 to 32 inches, yellowish brown and strong brown channery loam

32 to 39 inches, strong brown channery fine sandy loam

Underlying material:

39 to 56 inches, multicolored channery fine sandy loam saprolite

Weathered bedrock:

56 to 60 inches, multicolored, weathered metasedimentary bedrock

Permeability is moderately rapid. The depth to weathered bedrock is 40 to 60 inches, and the depth to hard bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Santeetlah, Soco, Spivey, and Stecoah soils. Soco and Stecoah soils are on south- to west-facing slopes and have a surface layer that is thinner or lighter colored than that of the Cheoah soil. Also, Soco soils are moderately deep to weathered bedrock. Santeetlah and Spivey soils are very deep and are in drainageways. Also, Spivey soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included are soils that are similar to the Cheoah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles or on the lower side slopes.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor recreational purposes, such as hiking trails.

This soil is poorly suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for the management concerns. The slope and the severe hazard of erosion are the main management concerns. The most common trees are northern red oak, black cherry, sweet birch, and sugar maple. Yellow-poplar is common on previously cleared sites or at elevations below 4,000 feet. Yellow birch, American beech, and eastern hemlock are common at elevations above 4,000 feet. Scarlet oak, white oak, black oak, and hickory are common in severely high-graded areas.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine generally is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the organic matter content in the surface layer.

This map unit is poorly suited to building site development, pasture, hay, and crops because of the slope, the severe hazard of erosion, difficult access across the steep terrain, and the cold winters.

This map unit is poorly suited to outdoor recreational uses. Some areas, however, are used for scenic overlooks and hiking trails. The slope and the severe hazard of erosion are the main management concerns. The trails are very slick during wet periods.

This map unit is poorly suited to access roads because of the slope, the instability of the underlying bedrock, and the severe hazard of erosion. Revegetating large areas that have been cut and filled is difficult because of the slope and slumping. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Building roadbeds on the natural soil, where possible, minimizes slumping. Outsloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

ChF—Cheoah channery loam, 50 to 95 percent slopes. This map unit consists mainly of very steep, deep, well drained Cheoah and similar soils on side slopes in the intermediate mountains. They are on north- to east-facing side slopes or on slopes shaded by the higher mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Cheoah soil are as follows—

Surface layer:

0 to 15 inches, very dark grayish brown and dark yellowish brown channery loam

Subsoil:

15 to 32 inches, yellowish brown and strong brown channery loam

32 to 39 inches, strong brown channery fine sandy loam

Underlying material:

39 to 56 inches, multicolored channery fine sandy loam saprolite

Weathered bedrock:

56 to 60 inches, multicolored, weathered metasedimentary bedrock

Permeability is moderately rapid. The depth to weathered bedrock is 40 to 60 inches, and the depth to hard bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Santeetlah,

Soco, Spivey, and Stecoah soils. Soco and Stecoah soils are on south- to west-facing slopes and have a surface layer that is thinner or lighter colored than that of the Cheoah soil. Also, Soco soils are moderately deep to weathered bedrock. Santeetlah and Spivey soils are very deep and are in drainageways. Also, Spivey soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of rock outcrop near the ridges. Inclusions make up about 15 percent of this map unit.

Also included are soils that are similar to the Cheoah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor recreational purposes, such as hiking trails and scenic overlooks.

This soil is poorly suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for the management concerns. The slope, plant competition, and the severe hazard of erosion are the main management concerns. The most common trees are northern red oak, black cherry, sweet birch, and sugar maple. Yellow-poplar is common on previously cleared sites or at elevations below 4,000 feet. Yellow birch, American beech, and eastern hemlock are common at elevations above 4,000 feet. Scarlet oak, white oak, black oak, and hickory are common in severely high-graded areas.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine generally is planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is unsuited to building site development, pasture, hay, and crops because of the slope, the severe hazard of erosion, difficult access across the steep terrain, and the cold winters.

This map unit is poorly suited to outdoor recreational uses. A few areas are used for hiking trails and scenic overlooks. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods.

This map unit is poorly suited to access roads because of the slope, the instability of the underlying bedrock, and the severe hazard of erosion. Revegetating large areas that have been cut and filled is difficult because of the slope and slumping. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Building roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

CnC—Chestnut-Edneyville complex, windswept, 8 to 15 percent slopes, stony. This map unit occurs mainly as areas of a moderately deep Chestnut soil and a very deep Edneyville soil. Both soils are well drained. The unit is on strongly sloping, south- to west-facing ridgetops in the intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Chestnut soil are as follows—

Surface layer:

0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

The typical sequence, depth, and composition of the layers in the Edneyville soil are as follows—

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Chestnut soil and more than 60 inches in the Edneyville soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Chestnut and Edneyville soils. Cowee and Evard soils are redder than the Chestnut and Edneyville soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chestnut and Edneyville soils but have a redder subsoil or have fewer rocks on the surface.

Most of the acreage in this map unit is used as woodland. Some areas are used as building sites for summer homes or for recreational development, pasture, or hayland.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, and black locust.

This map unit is only moderately suited to building site development because of the slope, difficult access across the steep terrain, the harsh climate, and the severe hazard of erosion. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil. The harsh climate in winter increases the costs of utilities and maintenance. Revegetating and maintaining bare areas are difficult because of the slope and freezing and thawing. Hydroseeding is a good way to revegetate bare areas.

This map unit is moderately suited to outdoor recreational uses, such as campsites, overlooks, and hiking trails. Because this map unit is on ridgetops, campsites that have a convenient source of water are scarce. The slope, stones, and the severe hazard of erosion also are management concerns. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is well suited to pasture and hay. The harsh climate, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Livestock shelters are needed during the winter. Keeping the pasture and hayland in good condition conserves soil and water.

This map unit is moderately suited to access roads. The slope and freezing and thawing are the main management concerns. Freezing and thawing in spring and fall and frequent ice storms in winter increase the costs of maintaining the roads.

The capability subclass is IVe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2D in areas of the Chestnut soil and 2A in areas of the Edneyville soil.

CnD—Chestnut-Edneyville complex, windswept, 15 to 30 percent slopes, stony. This map unit occurs mainly as areas of a moderately deep Chestnut soil and a very deep Edneyville soil. Both soils are well drained. The unit is on moderately steep, south- to west-facing ridgetops in the intermediate mountains. Areas on ridgetops are long and narrow. They range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Chestnut soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly fine sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

The typical sequence, depth, and composition of the layers in the Edneyville soil are as follows—

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Chestnut soil and more than 60 inches in the Edneyville soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Operating farm equipment is difficult on this map unit.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Chestnut and Edneyville soils. Cowee and Evard soils are redder than the Chestnut and Edneyville soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chestnut and Edneyville soils but have a redder subsoil or have fewer rocks on the surface.

Most of the acreage in this map unit is used as woodland. Some areas are used as building sites for summer homes or for recreational development, pasture, or hayland.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, and black locust.

This map unit is poorly suited to building site development because of the slope, difficult access across the steep terrain, the harsh climate, and the severe hazard of erosion. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil. The harsh climate in winter increases the costs of utilities and maintenance. Revegetating and maintaining bare areas are difficult because of the slope and freezing and thawing. Hydroseeding is a good way to revegetate bare areas.

This map unit is moderately suited to recreational uses, such as campsites, overlooks, and hiking trails. Some areas have scenic vistas and are used as overlooks. Because this map unit is on ridgetops, campsites that have a convenient source of water are scarce. The slope, stones, the severe hazard of erosion, and the harsh climate are the main management concerns. The trails are slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is moderately suited to pasture and hay. The slope, the harsh climate, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Livestock shelters are needed during the winter. Keeping the pasture and hayland in good condition conserves soil and water.

This map unit is poorly suited to specialty crops because of the slope, the severe hazard of erosion, difficult access across the steep terrain, and the harsh climate.

This map unit is poorly suited to access roads. The slope and freezing and thawing are the main management concerns. Freezing and thawing in spring and fall and frequent ice storms in winter increase the costs of maintaining the roads.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

CnE—Chestnut-Edneyville complex, windswept, 30 to 50 percent slopes, stony. This map unit occurs mainly as areas of a moderately deep Chestnut soil and a very deep Edneyville soil. Both soils are well drained. The unit is on steep, south- to west-facing ridgetops and side slopes in the intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The

two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Chestnut soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly fine sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

The typical sequence, depth, and composition of the layers in the Edneyville soil are as follows—

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Chestnut soil and more than 60 inches in the Edneyville soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Operating farm equipment is dangerous on this map unit, and nearly all farming operations are done by hand.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Chestnut and Edneyville soils. Cowee and Evard soils are redder than the Chestnut and Edneyville soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Chestnut and Edneyville soils but have a redder subsoil or have fewer rocks on the surface.

Most of the acreage in this map unit is used as woodland. A few areas are used as building sites for summer homes or for recreational development or pasture.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope and the severe hazard of erosion are also management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, and black locust.

This map unit is poorly suited to building site development. The slope, difficult access across the steep terrain, the harsh climate, and the severe hazard of erosion are the main management concerns. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil. The harsh climate in winter increases the costs of utilities and maintenance. Revegetating and maintaining bare areas are difficult because of the slope and freezing and thawing. Hydroseeding is a good way to revegetate steep, bare areas.

This map unit is poorly suited to most recreational uses, such as campsites and hiking trails. Some areas have scenic vistas and are used as overlooks. The slope, stones, the severe hazard of erosion, and the harsh climate are the main management concerns. The trails are slick during wet periods. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is poorly suited to pasture and is unsuited to hay. The slope, the harsh climate, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Livestock shelters are needed during the winter. Keeping the pasture in good condition conserves soil and water.

This map unit is unsuited to specialty crops, such as landscaping plants and Christmas trees. The slope, the severe hazard of erosion, difficult access across the steep terrain, and the harsh climate are the main management concerns.

This map unit is poorly suited to access roads. The slope is the main limitation. Freezing and thawing in spring and fall and frequent ice storms in winter increase the costs of maintaining the roads.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

CpD—Cleveland-Chestnut-Rock outcrop complex, windswept, 15 to 30 percent slopes. This map unit occurs mainly as areas of a shallow, somewhat excessively drained Cleveland soil and a moderately deep, well drained Chestnut soil and areas of Rock outcrop. The unit is on moderately steep ridgetops in the intermediate mountains. Individual areas are oblong in shape and range from 10 to 60 acres in size. Typically, they are 30 to 40 percent Cleveland soil, 30 to 40 percent Chestnut soil, and 10 to 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Cleveland soil are as follows—

Surface layer:
0 to 5 inches, black sandy loam

Subsoil:
5 to 17 inches, yellowish brown loam

Hard bedrock:
17 inches, hard, high-grade metamorphic bedrock

The typical sequence, depth, and composition of the layers in the Chestnut soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly fine sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in the Cleveland and Chestnut soils. The depth to hard bedrock is 10 to 20 inches in the Cleveland soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Establishing and maintaining vegetation are very difficult in bare areas.

Included in mapping are small areas of Chandler and Edneyville soils. These soils are very deep and are in concave areas or on the lower part of the slopes. Also, Chandler soils have more mica than the Cleveland and Chestnut soils. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cleveland and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Much of the acreage in this map unit is used as woodland. Some areas are used for building site development, pasture, or recreational development.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion also are management concerns. The most common trees are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, hickory, and northern red oak.

This map unit is poorly suited to building site development. The limited depth to bedrock, numerous areas of Rock outcrop, the slope, and the severe hazard of erosion are management concerns. Some areas have many scenic vistas and are commonly used as sites for summer homes. Establishing and maintaining vegetation are difficult and costly in bare areas. Excavation for dwellings with basements is hampered by the limited depth to bedrock. Suitable sites for septic tank absorption fields are scarce because of the limited depth to bedrock. The hazard of ground-water contamination or stream pollution is severe.

This map unit is poorly suited to pasture. The depth to bedrock, numerous areas of Rock outcrop, difficult access across the steep terrain, the slope, and the severe hazard of erosion are management concerns. Operating farm equipment is difficult on the Cleveland and Chestnut soils. Erosion is a major hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is poorly suited to most recreational uses. Many areas have scenic vistas, however, and are used for overlooks. The slope, the depth to bedrock, and the harsh climate are the main management concerns.

This map unit is unsuited to crops. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The depth to bedrock, numerous areas of Rock outcrop, the slope, and the severe hazard of erosion are management concerns. Building and maintaining the roads are difficult and costly. Drilling and blasting of the hard bedrock commonly are needed. Building the roadbed on the natural soil, where possible, minimizes slumping. Hydroseeding is a good way to vegetate steep, bare areas.

The capability subclass is VIIe in areas of the Cleveland soil, VIe in areas of the Chestnut soil, and VIIIs in areas of the Rock outcrop. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2D in areas of the Cleveland soil. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R in areas of the Chestnut soil. The Rock outcrop has not been assigned a woodland ordination symbol.

CpE—Cleveland-Chestnut-Rock outcrop complex, windswept, 30 to 50 percent slopes. This map unit occurs mainly as areas of a shallow, somewhat excessively drained Cleveland soil and a moderately deep, well drained Chestnut soil and areas of Rock outcrop. The unit is on steep head slopes and ridgetops in the intermediate mountains. In most areas crossing the landscape is difficult and dangerous. Individual areas are irregular in shape and range from 10 to 80 acres in size. Typically, they are 35 to 45 percent Cleveland soil, 25 to 35 percent Chestnut soil, and 10 to 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Cleveland soil are as follows—

Surface layer:
0 to 5 inches, black sandy loam

Subsoil:
5 to 17 inches, yellowish brown loam

Hard bedrock:
17 inches, hard, high-grade metamorphic bedrock

The typical sequence, depth, and composition of the layers in the Chestnut soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly fine sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in the Cleveland and Chestnut soils. The depth to hard bedrock is 10 to 20 inches in the Cleveland soil. The depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Establishing and maintaining vegetation are very difficult in bare areas. Landslides are common during prolonged periods of heavy rainfall.

Included in mapping are small areas of the very deep Chandler, Edneyville, Plott, and Cullasaja soils. Chandler soils have more mica than the Cleveland and Chestnut soils. Edneyville soils are very deep and occur in concave areas. Plott and Cullasaja soils have a dark surface layer that is thicker than that of the Cleveland and Chestnut soils. Cullasaja soils formed in colluvium and have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cleveland and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Much of the acreage in this map unit is used as woodland. Some areas are used as pasture or for building site development or recreational development.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion are also management concerns. The most common trees on south- to west-facing slopes are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, and hickory. The most common trees on north- to east-facing slopes are northern red oak, sweet birch, and eastern hemlock.

This map unit is poorly suited to pasture. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion are management concerns. Operating farm equipment is dangerous on the Cleveland and Chestnut soils. Generally, weeds are controlled and fertilizer and lime are applied by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is poorly suited to building site development. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion are management concerns. Some areas have scenic vistas and are commonly used as sites for summer homes. Establishing and maintaining vegetation in bare areas is difficult. Excavation for dwellings with basements is hampered by the limited depth to bedrock. Suitable sites for septic tank absorption fields are scarce because of the slope and the depth to bedrock. The absorption fields commonly are dug by hand because of the slope. The hazard of

ground-water contamination or stream pollution is severe.

This map unit is poorly suited to recreational uses. Many areas have scenic vistas, however, and are used for scenic overlooks. The slope, the depth to hard bedrock, and numerous areas of Rock outcrop are the main limitations.

This map unit is unsuited to crops because of the slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion.

This map unit is poorly suited to access roads. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion are management concerns. Building and maintaining the roads are difficult and costly. Drilling and blasting of the hard bedrock commonly are needed. Building the roadbed on the natural soil, where possible, minimizes slumping. Hydroseeding is a good way to revegetate steep, bare areas.

The capability subclass is VIIe in areas of the Cleveland and Chestnut soils and VIIIs in areas of the Rock outcrop. Based on chestnut oak as the indicator species in areas of the Cleveland soil and northern red oak as the indicator species in areas of the Chestnut soil, the woodland ordination symbol is 2R. The Rock outcrop has not been assigned a woodland ordination symbol.

CpF—Cleveland-Chestnut-Rock outcrop complex, windswept, 50 to 95 percent slopes. This map unit occurs mainly as areas of a shallow, somewhat excessively drained Cleveland soil and a moderately deep, well drained Chestnut soil and areas of Rock outcrop. The unit is on very steep head slopes in the intermediate mountains. In most areas crossing the landscape is difficult and dangerous. Individual areas are irregular in shape and range from 20 to 150 acres in size. Typically, they are 40 to 50 percent Cleveland soil, 20 to 30 percent Chestnut soil, and 10 to 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Cleveland soil are as follows—

Surface layer:
0 to 5 inches, black sandy loam

Subsoil:
5 to 17 inches, yellowish brown loam

Hard bedrock:
17 inches, hard, high-grade metamorphic bedrock

The typical sequence, depth, and composition of the layers in the Chestnut soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly fine sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in the Cleveland and Chestnut soils. The depth to hard bedrock is 10 to 20 inches in the Cleveland soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Establishing and maintaining vegetation are very difficult in bare areas. Landslides are common during prolonged periods of heavy rainfall.

Included in mapping are small areas of the very deep Chandler, Edneyville, Plott, and Cullasaja soils. Chandler soils have more mica than the Cleveland and Chestnut soils. Edneyville soils are very deep and occur in concave areas. Plott and Cullasaja soils have a dark surface layer that is thicker than that of the Cleveland and Chestnut soils. Cullasaja soils formed in colluvium and have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cleveland and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Much of the acreage in this map unit is used as woodland. A few areas are used as pasture or for building site development or recreational development.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, stones, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion also are management concerns. The most common trees on south- to west-facing slopes are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, and hickory. The most common trees on north- to east-facing slopes are northern red oak, sweet birch, and eastern hemlock.

This map unit is poorly suited to pasture. The slope, stones, the depth to bedrock, numerous areas of Rock outcrop, and the very severe hazard of erosion are the main management concerns. Operating farm equipment

is very dangerous on the Cleveland and Chestnut soils. Generally, weeds are controlled and fertilizer and lime are applied by hand. Erosion is a major hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas.

This map unit is poorly suited to building site development. Some areas have many scenic vistas and are commonly used as sites for summer homes. The slope, stones, the depth to bedrock, numerous areas of Rock outcrop, and the very severe hazard of erosion are management concerns. Establishing and maintaining vegetation are difficult in bare areas. Excavation for dwellings with basements is hampered by the limited depth to bedrock. Suitable sites for septic tank absorption fields are scarce because of the slope and the depth to bedrock. The absorption fields commonly are dug by hand because of the slope. The hazard of ground-water contamination or stream pollution is severe.

This map unit is poorly suited to most recreational uses. Many areas have scenic vistas, however, and are used for scenic overlooks. The slope, the depth to bedrock, and numerous areas of Rock outcrop are the main limitations.

The map unit is unsuited to crops. The slope, the depth to bedrock, numerous areas of Rock outcrop, the severe climate, and the very severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, the depth to bedrock, numerous areas of Rock outcrop, and the very severe hazard of erosion are management concerns. Building and maintaining the roads are difficult and costly. Drilling and blasting of the hard bedrock commonly are needed. Building the roadbed on the natural soil, where possible, minimizes slumping. Hydroseeding is a good way to vegetate steep, bare areas.

The capability subclass is VIIe in areas of the Cleveland and Chestnut soils and VIIIs in areas of the Rock outcrop. Based on chestnut oak as the indicator species in areas of the Cleveland soil and northern red oak in areas of the Chestnut soil, the woodland ordination symbol is 2R. The Rock outcrop has not been assigned a woodland ordination symbol.

CrD—Cowee-Evard-Urban land complex, 15 to 30 percent slopes. This map unit consists mainly of a moderately deep Cowee soil, a very deep Evard soil, and areas of Urban land. Both soils are well drained. They are on moderately steep ridgetops and side slopes in the low mountains. Individual areas are irregular in shape and range from 5 to 40 acres in size. Typically, they are 35 to 45 percent Cowee soil, 15 to 25 percent Evard soil, and 15 to 25 percent Urban land. The Cowee and Evard soils and Urban land occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Cowee soil are as follows—

Surface layer:
0 to 5 inches, reddish brown gravelly sandy loam

Subsoil:
5 to 13 inches, red gravelly sandy loam
13 to 27 inches, red gravelly sandy clay loam

Weathered bedrock:
27 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

The typical sequence, depth, and composition of the layers in the Evard soil are as follows—

Surface layer:
0 to 6 inches, dark brown and strong brown gravelly loam

Subsoil:
6 to 27 inches, red clay loam
27 to 35 inches, mottled red, yellowish red, and strong brown loam

Underlying material:
35 to 60 inches, multicolored sandy loam saprolite

Urban land consists of areas where the original soils have been cut, filled, graded, or paved. Soil properties have been so altered that a soil series is not recognized. These areas are used for buildings, streets, parking lots, or other uses where buildings are closely spaced or the soils are covered with pavement. The extent of site modification varies greatly.

Permeability is moderate in the Cowee and Evard soils. The depth to bedrock is more than 60 inches in the Evard soil. The depth to weathered bedrock is 20 to 40 inches in the Cowee soil. Surface runoff is rapid.

Included in mapping are small areas of Braddock and Saunook soils. Braddock soils are on high stream terraces and have more clay in the subsoil than the Cowee and Evard soils. Saunook soils are along drainageways and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cowee and Evard soils but have a browner subsoil or have more rocks on the surface.

Because areas of this unit are covered by impermeable material, such as buildings, streets, and parking lots, the rate of surface runoff is higher than that on other Cowee and Evard soils. During periods of heavy rainfall, the runoff is difficult to control and is concentrated in concave areas. The hazard of erosion

is severe during and immediately after construction if the surface is left bare and unprotected. Hydroseeding is a good way to revegetate bare areas.

The Cowee and Evard soils in open areas of this map unit commonly are used for lawns, gardens, and open areas. In many areas, the soil material has been compacted during construction. Compaction of the soil increases crusting and clodding, which interfere with the germination of seeds and increase the costs of landscaping. Also, the moderate depth to weathered bedrock in the Cowee soil lowers the survival and growth rate of some landscaping plants.

The capability subclass is VIe in areas of the Cowee and Evard soils and VIIIs in areas of Urban land. This unit has not been assigned a woodland ordination symbol.

CsD—Cullasaja very cobbly fine sandy loam, 15 to 30 percent slopes, extremely bouldery. This map unit consists mainly of moderately steep, very deep, well drained Cullasaja and similar soils in coves below areas of rock outcrop or on toe slopes at the base of nearly vertical rock cliffs. Most areas of this map unit are in the intermediate mountains in the southern part of the county. Areas in coves are bowl shaped in the lower part and finger up the drainageways. Areas on toe slopes are long and narrow. Individual areas range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers in the Cullasaja soil are as follows—

Surface layer:

0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:

13 to 26 inches, dark yellowish brown very cobbly fine sandy loam

26 to 38 inches, yellowish brown very cobbly sandy loam

38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

Permeability is moderately rapid. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. The seasonal high water table is more than 6 feet below the surface. Because of the boulders and stones on the surface, tillage is impossible. In some areas the boulders are 30 feet long and 15 feet high. The hazard of erosion is severe in areas where the forest litter has been removed.

Included in mapping are small areas of Tuckasegee soils. These soils have less than 35 percent rock fragments in the subsoil. They are in convex areas between drainageways. Also included are small areas of rubble land and moderately well drained or somewhat poorly drained soils around springs and seeps. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja soil but have a dark surface layer that is less than 10 or more than 20 inches thick or are near drainageways and have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils generally are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils generally are on the north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded.

This soil is poorly suited to commercial timber because of the numerous boulders on the surface. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for the management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other trees include black cherry, American beech, yellow buckeye, eastern hemlock, and eastern white pine at the lower elevations. Black cherry, sweet birch, yellow birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Because of the boulders and stones, operating equipment, building access roads, and managing and harvesting timber are difficult and costly. In some areas, the boulders are so large that removing them requires drilling and blasting (fig. 9). Large boulders are so numerous in most areas that the use of wheeled equipment is impractical. When falling trees strike the large boulders, timber is seriously damaged during harvesting. Cable logging is limited in many areas because nearly vertical rock cliffs are on the upslope side of the area.

This map unit is poorly suited to access roads. Boulders, the slope, and runoff from the adjacent higher areas are the main limitations. Because of the boulders and stones, road building is difficult and expensive. Access roads are dangerous because of falling rocks, especially during prolonged periods of heavy rainfall. Cutbanks are unstable, and the roads should be designed so that runoff from the adjacent higher areas and water from springs and seeps are properly diverted.

This map unit is unsuited to pasture, hayland, specialty crops, row crops, recreation, and building site

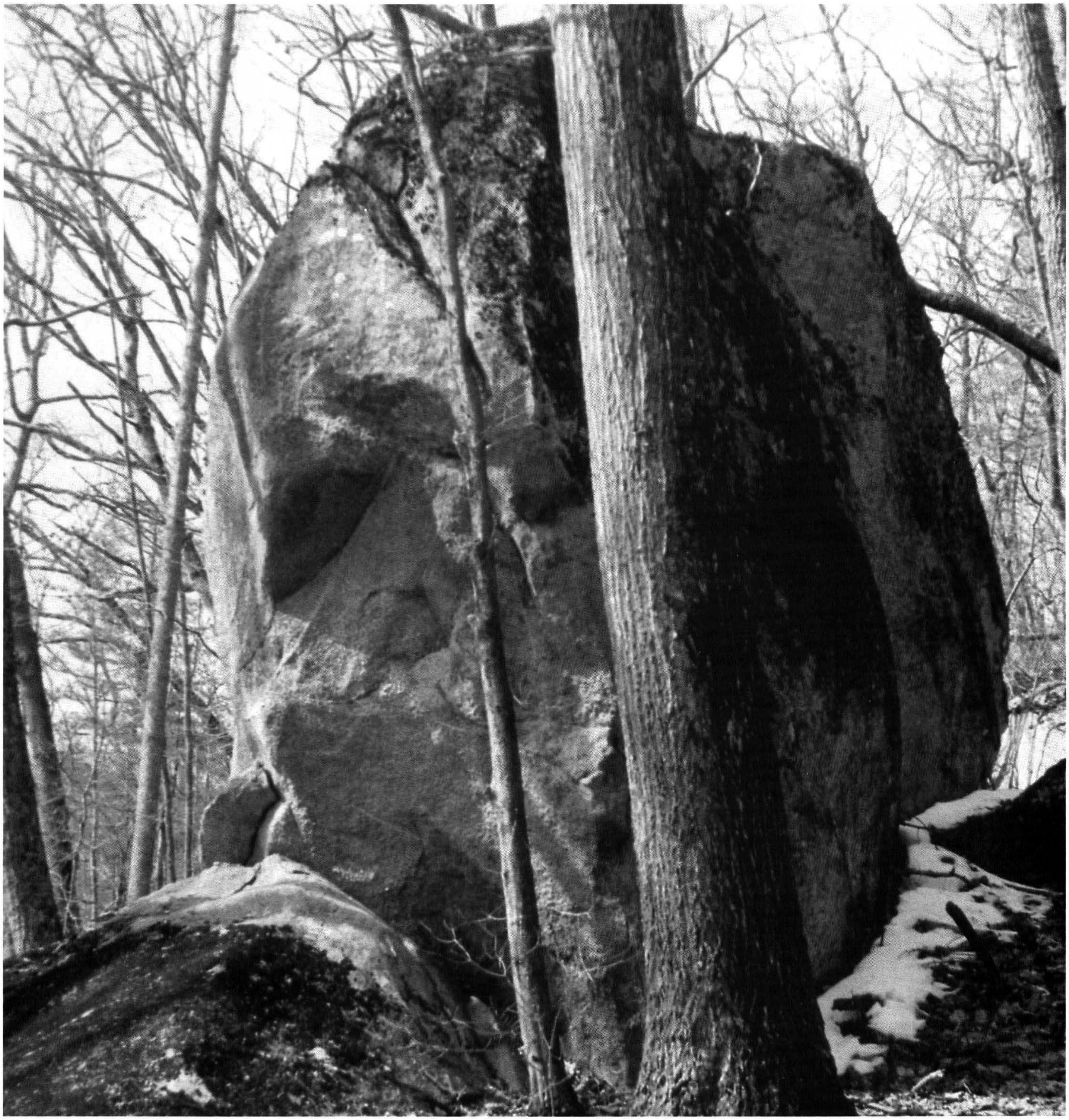

Figure 9.—Large boulders hinder timber management on Cullasaja very cobbly fine sandy loam, 15 to 30 percent slopes, extremely bouldery.

development because of the boulders on the surface and the slope.

The capability subclass is VIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

CsE—Cullasaja very cobbly fine sandy loam, 30 to 50 percent slopes, extremely bouldery. This map unit consists mainly of steep, very deep, well drained Cullasaja and similar soils in coves below areas of rock outcrop or on toe slopes at the base of nearly vertical rock cliffs. Most areas of this map unit are in the intermediate mountains in the southern part of the county. Areas in coves are bowl shaped in the lower part and finger up the drainageways. Areas on toe slopes are long and narrow. Individual areas range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers in the Cullasaja soil are as follows—

Surface layer:

0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:

13 to 26 inches, dark yellowish brown very cobbly fine sandy loam

26 to 38 inches, yellowish brown very cobbly sandy loam

38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

Permeability is moderately rapid. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. The seasonal high water table is more than 6 feet below the surface. Because of the boulders and stones on the surface, tillage is impossible. In some areas the boulders are 30 feet long and 15 feet high. The hazard of erosion is severe in areas where the forest litter has been removed.

Included in mapping are small areas of Tuckasegee soils. These soils have less than 35 percent rock fragments in the subsoil. They are in convex areas between drainageways. Also included are small areas of rubble land and moderately well drained or somewhat poorly drained soils around springs and seeps. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja soil but have a dark surface layer that is less than 10 or more than 20 inches thick or are near drainageways and have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils generally are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils generally are on the north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded.

This soil is poorly suited to commercial timber. The numerous boulders on the surface, the severe hazard of erosion, and the slope are the main management concerns. The unit is desirable for timber production, however, because of the high productivity of the commercial species, which helps to compensate for the management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other trees include black cherry, American beech, yellow buckeye, eastern hemlock, and eastern white pine at the lower elevations. Black cherry, sweet birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Because of the boulders and stones, operating equipment, building access roads, and managing and harvesting timber are difficult and costly. In some areas, the boulders are so large that removing them requires drilling and blasting. Large boulders are so numerous in most areas that the use of wheeled equipment is impractical. When falling trees strike the large boulders, timber is seriously damaged during harvesting. Cable logging is limited in many areas because the nearly vertical rock cliffs are on the upslope side of the area.

This map unit is poorly suited to access roads. Boulders, the slope, and runoff from the higher adjacent areas are the main limitations. Because of the boulders and stones, road building is difficult and expensive. Access roads are dangerous because of falling rocks, especially during prolonged periods of heavy rainfall. Cutbanks are unstable, and the roads should be designed so that runoff from the adjacent higher areas and water from springs and seeps are properly diverted.

This map unit is unsuited to pasture, hayland, specialty crops, row crops, recreation, and building site development because of the boulders on the surface and the slope.

The capability subclass is VIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

CuC—Cullasaja-Tuckasegee complex, 8 to 15 percent slopes, stony. This map unit occurs mainly as areas of strongly sloping, very deep, well drained Cullasaja and Tuckasegee soils on benches and toe slopes in coves in the intermediate mountains. Typically, the Tuckasegee soil is between

drainageways and the Cullasaja soil is along the drainageways. Individual areas are bowl shaped in the lower part and long and narrow as they extend up the drainageways. They range from 4 to 30 acres in size. Typically, they are 45 to 55 percent Cullasaja soil and 25 to 35 percent Tuckasegee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Cullasaja soil are as follows—

Surface layer:
0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:
13 to 26 inches, dark yellowish brown very cobbly fine sandy loam
26 to 38 inches, yellowish brown very cobbly sandy loam
38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

The typical sequence, depth, and composition of the layers in the Tuckasegee soil are as follows—

Surface layer:
0 to 11 inches, very dark brown gravelly loam

Subsoil:
11 to 24 inches, dark yellowish brown loam and gravelly loam
24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

Permeability is moderately rapid in both soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface. Tillage is difficult, especially in areas of the Cullasaja soil, because of the stones on the surface. The Tuckasegee soil is friable and can be tilled throughout a wide range in moisture content.

Included in mapping are small areas of Dellwood and Whiteside soils. Dellwood soils are occasionally flooded and are moderately well drained. Whiteside soils are moderately well drained. They are in depressions. Springs and seeps are also common in some map units. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja and Tuckasegee soils but have a dark surface layer that is less than 10 or more than 20 inches thick or have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils commonly are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils commonly are on the north- to east-facing slopes.

Most of the acreage in this map unit is used as woodland. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This map unit is well suited to commercial timber. Plant competition, the slope, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other trees include black cherry, American beech, sweet birch, northern red oak, sugar maple, white oak, black locust, yellow buckeye, eastern hemlock, and eastern white pine. Black cherry, yellow birch, sweet birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick during wet periods because of the slope, the organic matter content in the surface layer, and the content of clay, especially in areas of the Tuckasegee soil.

This map unit is moderately suited to pasture and hay. Stones, the slope, the severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. The stones damage farm equipment used for establishing and maintaining pasture and mowing and baling hay, especially in areas of the Cullasaja soil. The Tuckasegee soil has fewer stones on the surface and is better suited to pasture and hay. Erosion is a hazard in areas where plants are

becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings helps to prevent damage to streambanks. Keeping pasture and hayland in good condition conserves soil and water.

The Cullasaja soil is poorly suited to row crops or specialty crops. The Tuckasegee soil is moderately suited to row crops or specialty crops, such as ginseng, landscaping plants, and Christmas trees. Stones, the slope, the severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees. Preparing a seedbed and harvesting plants are difficult, especially in areas of the Cullasaja soil. The Cullasaja soil is better suited to Fraser fir and eastern white pine harvested as cut trees. The Tuckasegee soil has fewer stones and is preferred for crops that must be dug during harvesting.

The Cullasaja soil in this map unit is poorly suited to building site development, and the Tuckasegee soil is moderately suited. The slope, stones, runoff from the higher adjacent areas, and the severe hazard of erosion are management concerns. The Tuckasegee soil is better suited to building site development than the Cullasaja soil because it has fewer stones on the surface and seeps and springs are less common. Excavation for dwellings with basements is hampered by stones and underground water from seeps and springs. A drainage system is needed in these areas. Building sites should be designed so that runoff from the higher adjacent areas is diverted. Sites that are wet because of seeps, springs, and runoff and, where practical, areas of the Cullasaja soil should not be used for septic tank absorption fields.

This map unit is moderately suited to some recreational uses, such as campsites and trailer parks. Because this map unit has adequate shade and springs that provide drinking water and is near streams, it commonly is used for campsites and trailer parks. The slope, stones, and the severe hazard of erosion are management concerns.

The Cullasaja soil in this map unit is poorly suited to access roads, and the Tuckasegee soil is moderately suited. Stones, runoff from the higher adjacent areas, springs, seeps, and the severe hazard of erosion are management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced and properly maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

The capability subclass is VIIs in areas of the Cullasaja soil and IIIe in areas of the Tuckasegee soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8X in areas of the Cullasaja soil and 8A in areas of the Tuckasegee soil.

CuD—Cullasaja-Tuckasegee complex, 15 to 30 percent slopes, stony. This map unit occurs mainly as areas of moderately steep, very deep, well drained Cullasaja and Tuckasegee soils on benches and toe slopes in coves in the intermediate mountains. Typically, the Tuckasegee soil is between drainageways and the Cullasaja soil is along the drainageways. Individual areas are bowl shaped in the lower part and long and narrow as they extend up the drainageways. They range from 4 to 80 acres in size. Typically, they are 45 to 55 percent Cullasaja soil and 25 to 35 percent Tuckasegee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Cullasaja soil are as follows—

Surface layer:

0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:

13 to 26 inches, dark yellowish brown very cobbly fine sandy loam

26 to 38 inches, yellowish brown very cobbly sandy loam

38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

The typical sequence, depth, and composition of the layers in the Tuckasegee soil are as follows—

Surface layer:

0 to 11 inches, very dark brown gravelly loam

Subsoil:

11 to 24 inches, dark yellowish brown loam and gravelly loam

24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

Permeability is moderately rapid in both soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface. Tillage is difficult, especially in areas of the

Cullasaja soil, because of the stones on the surface. The Tuckasegee soil is friable and can be tilled throughout a wide range in moisture content.

Included in mapping are small areas of Chandler, Chestnut, Edneyville, and Plott soils. Chandler, Chestnut, and Edneyville soils formed in saprolite on south- to west-facing slopes. They have a surface layer that is thinner or lighter colored than that of the Cullasaja and Tuckasegee soils. Also, Chestnut soils are moderately deep to weathered bedrock and Chandler soils have more mica than the Cullasaja and Tuckasegee soils. Plott soils formed in saprolite on north- to east-facing side slopes. Also included are small areas of moderately well drained or somewhat poorly drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja and Tuckasegee soils but have a dark surface layer that is less than 10 or more than 20 inches thick or have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils commonly are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils commonly are on the north- to east-facing slopes.

Most of the acreage in this map unit is used as woodland. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This map unit is moderately suited to commercial timber. Plant competition, the slope, stones, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet (fig. 10). Other trees include black cherry, American beech, sweet birch, northern red oak, sugar maple, yellow buckeye, white oak, black locust, eastern hemlock, and eastern white pine. Black cherry, sweet birch, yellow birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick during wet periods because of the slope and the organic matter content in the surface layer.

This map unit is moderately suited to pasture and hay. Stones, the slope, the severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. The stones damage farm equipment used for establishing and maintaining pasture and mowing and baling hay, especially in areas of the Cullasaja soil. The Tuckasegee soil has fewer stones on the surface and is better suited to pasture and hay. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings helps to prevent damage to streambanks. Keeping the pasture and hayland in good condition conserves soil and water.

This map unit is poorly suited to specialty crops, such as ginseng, landscaping plants, and Christmas trees. Stones, the slope, the severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees. Preparing a seedbed and harvesting plants are difficult in areas of the Cullasaja soil. The Cullasaja soil is better suited to Fraser fir and eastern white pine harvested as cut trees. The Tuckasegee soil has fewer stones and is preferred for crops that must be dug during harvesting.

This map unit is poorly suited to building site development. The slope, stones, runoff from the higher adjacent areas, and the severe hazard of erosion are management concerns. The Tuckasegee soil is better suited to building site development than the Cullasaja soil because it has fewer stones and seeps or springs are less common. Excavation for dwellings with basements is hampered by stones and underground water from seeps and springs. A drainage system is needed in these areas. Building sites should be designed so that runoff from the higher adjacent areas is diverted. Sites that are wet because of seeps, springs, and runoff, and, where practical, areas of the Cullasaja soil should not be used for septic tank absorption fields.

This map unit is poorly suited to most recreational uses, such as campsites and trailer parks. Some areas

Figure 10.—A stand of yellow-poplar in coves on Cullasaja-Tuckasegee complex, 15 to 30 percent slopes, stony.

are used for hiking trails. The slope, stones, and the severe hazard of erosion are management concerns. The hiking trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to access roads

because of the slope, stones, runoff from the higher adjacent areas, springs, seeps, and the severe hazard of erosion. Because unsurfaced roads are soft and slick when wet, they should be surfaced and properly maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

The capability subclass is VIIs in areas of the Cullasaja soil and VIe in areas of the Tuckasegee soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

CuE—Cullasaja-Tuckasegee complex, 30 to 50 percent slopes, stony. This map unit occurs mainly as areas of steep, very deep, well drained Cullasaja and Tuckasegee soils on toe slopes in coves near the headwaters of streams in the intermediate mountains. Typically, the Cullasaja soil is along the drainageways and the Tuckasegee soil is between drainageways. Individual areas are bowl shaped in the lower part and long and narrow as they extend up the drainageways. They range from 10 to 80 acres in size. Typically, they are 45 to 55 percent Cullasaja soil and 25 to 35 percent Tuckasegee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Cullasaja soil are as follows—

Surface layer:

0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:

13 to 26 inches, dark yellowish brown very cobbly fine sandy loam

26 to 38 inches, yellowish brown very cobbly sandy loam

38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

The typical sequence, depth, and composition of the layers in the Tuckasegee soil are as follows—

Surface layer:

0 to 11 inches, very dark brown gravelly loam

Subsoil:

11 to 24 inches, dark yellowish brown loam and gravelly loam

24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

Permeability is moderately rapid in both soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface. Operating farm equipment is dangerous on this map unit. Most farming operations are done by hand.

Included in mapping are small areas of Chandler, Chestnut, Edneyville, and Plott soils. Chandler, Chestnut, and Edneyville soils formed in saprolite on south- to west-facing slopes. They have a surface layer that is thinner or lighter colored than that of the Cullasaja and Tuckasegee soils. Also, Chestnut soils are moderately deep to weathered bedrock and Chandler soils have more mica than the Cullasaja and Tuckasegee soils. Plott soils formed in saprolite on north- to east-facing side slopes. Also included are small areas of rubble land and areas of moderately well drained or somewhat poorly drained soils around seeps and springs. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja and Tuckasegee soils but have a dark surface layer that is less than 10 or more than 20 inches thick or have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils commonly are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils commonly are on the north- to east-facing slopes.

Most of the acreage in this map unit is used as woodland. A few areas are used for recreational development, pasture, or specialty crops.

This map unit is poorly suited to commercial timber. The slope, the severe hazard of erosion, runoff from the higher adjacent areas, stones, and plant competition are the main management concerns. This unit is desirable for timber production, however, because of the high productivity of the commercial species, which helps to compensate for the management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other trees include black cherry, American beech, yellow buckeye, eastern hemlock, white oak, black locust, and eastern white pine. Black cherry, sweet birch, yellow birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to

yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

When the soil is wet, unsurfaced roads are slick, soft, and dangerous because of the slope and the content of clay, especially in areas of the Tuckasegee soil. The roads should be designed so that runoff from the higher adjacent areas is properly diverted.

The map unit is poorly suited to recreational development because of the slope, stones, the severe hazard of erosion, and runoff from the higher adjacent areas. Some areas are used for hiking trails. The trails are very slick during wet periods.

This map unit is poorly suited to pasture and unsuited to hay. The slope, stones, the severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition conserves soil and water.

This map unit is poorly suited to specialty crops. In some areas, however, Fraser fir and eastern white pine are grown for use as Christmas trees. The slope, stones, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. Balling and burlapping Christmas trees is impractical in areas of the Cullasaja soil because of the numerous rock fragments. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, springs and seeps, and the severe hazard of erosion are management concerns. Building and maintaining the roads are difficult and costly. Building the roads near the area of contact with the uplands, where practical, helps to avoid the springs, the seeps, and the large stones. Revegetating large areas that have been cut and filled is difficult because of the slope. Hydroseeding is a good way to revegetate steep areas that have been cut and filled. Building roadbeds on the natural soil, where possible, minimizes slumping. The roads should be designed so that runoff from the higher adjacent areas is properly diverted. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. The water from seeps and springs should be properly diverted from the roadbeds. Road failures are common.

The capability subclass is VIIs in areas of the Cullasaja soil and VIIe in areas of the Tuckasegee soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

CuF—Cullasaja-Tuckasegee complex, 50 to 90 percent slopes, stony. This map unit occurs mainly as areas of very steep, very deep, well drained Cullasaja and Tuckasegee soils on toe slopes in coves at the headwaters of streams in the intermediate mountains. Typically, the Cullasaja soil is along the drainageways and the Tuckasegee soil is between the drainageways. Individual areas are bowl shaped in the lower part and long and narrow as they extend up the drainageways. They range from 5 to 30 acres in size. Typically, they are 45 to 55 percent Cullasaja soil and 25 to 35 percent Tuckasegee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Cullasaja soil are as follows—

Surface layer:

0 to 13 inches, black and very dark brown very cobbly fine sandy loam

Subsoil:

13 to 26 inches, dark yellowish brown very cobbly fine sandy loam

26 to 38 inches, yellowish brown very cobbly sandy loam

38 to 60 inches, dark yellowish brown extremely cobbly sandy loam

The typical sequence, depth, and composition of the layers in the Tuckasegee soil are as follows—

Surface layer:

0 to 11 inches, very dark brown gravelly loam

Subsoil:

11 to 24 inches, dark yellowish brown loam and gravelly loam

24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

Permeability is moderately rapid in both soils. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Chestnut, Edneyville, and Plott soils. Chestnut and Edneyville soils formed in saprolite on south- to west-facing slopes. They have a surface layer that is thinner or lighter colored than that of the Cullasaja and Tuckasegee soils. Also, Chestnut soils are moderately deep to weathered bedrock. Plott soils formed in saprolite on north- to east-facing side slopes. Also included are small areas of rubble land and areas of moderately well drained or somewhat poorly drained soils around seeps and springs. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullasaja and Tuckasegee soils but have a dark surface layer that is less than 10 or more than 20 inches thick or have a seasonal high water table 3 to 6 feet below the surface. Where the surface layer is less than 10 inches thick, the soils commonly are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils commonly are on the north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational development.

This map unit is poorly suited to commercial timber. The slope, the severe hazard of erosion, runoff from the higher adjacent areas, stones, and plant competition are the main management concerns. This unit is desirable for timber production, however, because of the high productivity of the commercial species, which helps to compensate for the management concerns. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other trees include black cherry, American beech, yellow buckeye, eastern hemlock, and eastern white pine. Black cherry, sweet birch, yellow birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

The slope restricts the kinds of equipment that can be used. Operating wheeled and tracked equipment is dangerous. A cable yarding system is safer, results in less damage to the soil, and helps to maintain productivity. When the surface is wet, unsurfaced roads are slick, soft, and dangerous because of the slope and the content of clay, especially in areas of the Tuckasegee soil.

This map unit is poorly suited to outdoor recreational uses. The slope, runoff from the higher adjacent areas, and stones are management concerns.

This map unit is poorly suited to pasture and unsuited to hay because of the slope.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, springs and seeps, and the severe hazard of erosion are management concerns. Building and maintaining the roads are difficult and costly. Building the roads near the area of contact with uplands helps to avoid the springs, the seeps, and the large stones. Revegetating large areas that have been cut and filled is difficult because of the slope. Hydroseeding is a good way to revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping. The roads should be designed so that runoff from the higher adjacent areas is properly diverted. Out-sloping road surfaces are needed because ditchbanks tend to slump. The water from seeps and springs should be properly diverted from the roadbeds. Road failures are common.

The capability subclass is VIIs in areas of the Cullasaja soil and VIIe in areas of the Tuckasegee soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

CwA—Cullowhee fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This map unit consists mainly of nearly level, somewhat poorly drained Cullowhee and similar soils that are very deep to bedrock and moderately deep to strata of gravel, cobbles, and sand. The strata have more than 35 percent rock fragments. The unit commonly is in depressions on flood plains along the smaller streams. Individual areas are long bands parallel to the stream channels. They range from 2 to 25 acres in size.

The typical sequence, depth, and composition of the layers in the Cullowhee soil are as follows—

Surface layer:

0 to 13 inches, very dark grayish brown and dark brown fine sandy loam

Underlying material:

13 to 23 inches, dark yellowish brown loamy sand that has strong brown and grayish brown mottles

23 to 35 inches, black loamy fine sand that has yellowish red and grayish brown mottles

35 to 65 inches, multicolored extremely gravelly sand

Permeability is moderately rapid in the upper layers and rapid or very rapid in the lower layers. Surface runoff is slow. Ponding occurs in depressions adjacent to the uplands. The soil is occasionally flooded for very brief periods. The seasonal high water table is 1.5 to 2.0 feet below the surface.

Included in mapping are small areas of Dellwood, Nikwasi, and Reddies soils. Dellwood soils are moderately well drained. They have more rock

fragments in the subsoil than the Cullowhee soil. They are along the upper reaches of small streams. Nikwasi soils are poorly drained or very poorly drained and are in depressions near the area of contact between the flood plains and the uplands. Reddies soils are moderately well drained and are on knolls. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cullowhee soil but have a lighter colored surface layer.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, or recreational development.

This map unit is moderately suited to pasture and hay. The flooding, the wetness, the ponding, soil compaction, and damage to streambanks are management concerns. Land shaping before seeding helps to open outlets and drain surface water from depressions. A tile drainage system may be needed in wet areas. Good drainage outlets, however, are rare. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can help to prevent damage to streambanks.

This map unit is moderately suited to crops. The flooding, the wetness, the ponding, and runoff from the higher adjacent areas are management concerns. The most common crops are silage corn, sweet corn, and strawberries. A tile drainage system commonly is needed to remove excess water. Good drainage outlets, however, are rare. Properly designed plowing patterns are needed to keep drainage outlets open and to prevent the formation of depressions. Land shaping helps to open outlets and drain surface water from depressions. Grassed field borders and grassed waterways can safely divert runoff. Irrigation commonly is used to protect high-value crops, such as strawberries, from frost and to supply additional water. Herbicides may be ineffective because of the organic matter content in the surface layer.

This map unit is moderately suited to specialty crops, such as landscaping plants and Christmas trees. The flooding, the wetness, runoff from the higher adjacent areas, and the ponding are management concerns. The most common landscaping plants are eastern hemlock, dog hobble, dogwood, white birch, and rhododendron. Also, eastern white pine is grown for use as Christmas trees. Grassed field borders and grassed waterways can safely divert runoff.

This map unit is poorly suited to building site development. The flooding and the wetness are the main management concerns.

This map unit is moderately suited to commercial timber. It is seldom used for commercial timber because of the small size of the mapped areas and the potentially higher profits from crops, pasture, or hayland. The most common trees are yellow-poplar, shortleaf pine, eastern white pine, American sycamore, red maple, yellow birch, and eastern hemlock.

This map unit is poorly suited to recreational uses. The flooding and the wetness are the main management concerns. Because this unit is nearly level and is near streams, some areas are used for campsites, parks, picnic areas, ball fields, or tennis courts.

This map unit is poorly suited to access roads. The flooding and the wetness are the main management concerns. Elevating the roads during construction minimizes the damage caused by flooding. The roads should be designed so that runoff is diverted. Wet areas should be drained.

The capability subclass is IIIw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8W.

DfA—Dellwood gravelly fine sandy loam, 0 to 3 percent slopes, occasionally flooded. This map unit consists mainly of nearly level, moderately well drained Dellwood and similar soils that are very deep to bedrock and shallow to strata of gravel, cobbles, and sand. The strata are more than 35 percent rock fragments. The unit is on narrow flood plains near stream origins (fig. 11). It is downstream from where a prominent decrease in stream gradient occurs. The surface is very uneven. It has numerous knolls and dips resulting from previous flood scouring, deposition, and channel movement. Individual areas are oblong in shape and range from 3 to 25 acres in size.

The typical sequence, depth, and composition of the layers in the Dellwood soil are as follows—

Surface layer:

0 to 16 inches, dark brown gravelly fine sandy loam and cobbly sandy loam

Underlying material:

16 to 60 inches, strong brown very cobbly loamy sand

Permeability is moderately rapid in the surface layer and rapid or very rapid in the lower layers. Surface runoff is slow. The soil is subject to occasional flash flooding for very brief periods. The seasonal high water table is 2 to 4 feet below the surface. Because of the stoniness, tillage is difficult. This map unit is a good source of gravel and is commonly used for this purpose.

Included in mapping are small areas of Cullowhee, Nikwasi, and Reddies soils. These soils are moderately

Figure 11.—An area of Dellwood gravelly fine sandy loam, 0 to 3 percent slopes, occasionally flooded, on initial flood plains, which are the first flood plains that form as water drains out of the mountains.

deep to strata of gravel, cobbles, and sand. The strata have more than 35 percent rock fragments. Also, Cullowhee and Nikwasi soils are in depressions. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Dellwood soil but have a surface layer that is lighter colored or thinner.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, building site development, recreational development, or woodland.

This map unit is moderately suited to pasture and hay. The flooding, stoniness, and droughtiness are the main management concerns. Removing large rocks minimizes the damage to farm equipment used to establish and maintain pasture and hayland. Also, rocks on the surface can damage equipment used for mowing and baling hay. Tall fescue and orchardgrass grow well because they are dormant in the droughty summer months. Properly locating watering facilities and stream crossings helps to minimize damage to streambanks.

This map unit is poorly suited to row crops because of the flooding, cobbles, droughtiness, the ponding in scoured depressions, runoff from the higher adjacent areas, and poor air drainage. The most common crops are silage corn, sweet corn, tomatoes, strawberries, and burley tobacco. Removing large rocks minimizes the damage to farm equipment used to plant, manage, or harvest crops. The harvesting of root crops and tilling the soil are hampered by the numerous small rock fragments that remain on the surface.

Split applications of fertilizer are needed because nutrients are easily leached. Also, split applications of fertilizer control the hazard of ground-water contamination and pollution in surrounding streams and lakes. Vegetative filter strips can improve water quality and provide wildlife habitat. Properly designed plowing patterns are needed to keep drainage outlets open and to prevent the formation of depressions that pond water. Land shaping helps to smooth the surface and open outlets to help drain surface water. A tile drainage system is needed for some crops, such as burley tobacco, during wet periods. Good drainage outlets, however, are rare. Irrigation is needed to protect crops, such as strawberries or tomatoes, from frost and to supply additional water during dry periods in the growing season. Diversions help to remove surface runoff from the higher areas. Installation of water management structures is difficult because of the stoniness and the scarcity of soil material.

Equipment can be used on this soil only hours after a heavy rain. This good access allows for timely planting, managing, and harvesting. The effectiveness of herbicides may be hampered by the content of organic matter in the surface layer.

This map unit is poorly suited to balled and burlapped specialty crops, such as landscaping plants and Christmas trees. Digging and preparing a ball for landscaping plants and Christmas trees are very difficult because of the stoniness, the limited soil depth, and the coarse texture of the soil. Fraser fir and eastern white pine commonly are grown for use as cut Christmas trees. Stoniness, the flooding, the low available water capacity, the ponding, and runoff from the higher adjacent areas are the main management concerns. Split applications of fertilizer are needed because nutrients are easily leached. Also, split applications of fertilizer control the hazard of contamination in ground water and surrounding streams and lakes. A tile drainage system may be needed for some crops, such as Fraser fir, during wet periods in the growing season. Irrigation may be needed for the same crops during dry periods in the growing season.

This map unit is poorly suited to building site development because of the hazard of occasional flash flooding.

This map unit is well suited to commercial timber. It is rarely used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, pasture, or hayland. The flooding is the main hazard affecting woodland management. Yellow-poplar is the most common tree. Other trees include sweet birch, eastern hemlock, black cherry, red maple, river birch, American sycamore, and eastern white pine.

This map unit is poorly suited to recreational uses because of the hazard of occasional flash flooding and the stoniness. Many areas are used for recreational purposes, such as campsites, parks, picnic areas, ball fields, or tennis courts, however, because the unit is nearly level, has easy access, and is near streams.

This map unit is poorly suited to access roads. The occasional flash flooding and runoff from the higher adjacent areas are the main management concerns. Elevating the roads during construction minimizes the damage caused by flooding. The roads should be designed so that surface water is diverted.

The capability subclass is IIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8F.

DrB—Dillard loam, 1 to 5 percent slopes, rarely flooded. This map unit consists mainly of nearly level and gently sloping, very deep, moderately well drained Dillard and similar soils on low stream terraces.

Individual areas are long bands that parallel flood plains and range from 1 to 20 acres in size.

The typical sequence, depth, and composition of the layers in the Dillard soil are as follows—

Surface layer:

0 to 9 inches, very dark grayish brown loam

Subsoil:

9 to 20 inches, yellowish brown sandy clay loam

20 to 37 inches, brownish yellow loam that has red and light gray mottles

37 to 70 inches, light gray clay loam that has yellowish brown, strong brown, and yellowish red mottles

Permeability is moderate. Surface runoff is slow or medium. The seasonal high water table is 2 to 3 feet below the surface.

Included in mapping are small areas of Hemphill, Reddies, Rosman, and Statler soils. Hemphill soils are very poorly drained and have slow permeability. They are in depressions near the area of contact between the low stream terrace and the uplands. Statler soils are well drained and have moderate permeability. They are on slightly elevated knolls. Reddies and Rosman soils have less clay in the subsoil than the Dillard soil. They are on flood plains. Also included are areas of somewhat poorly drained soils. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of Dillard soils that have more rocks on the surface.

Much of the acreage in this map unit is used for row crops. Some areas are used as pasture or hayland or for specialty crops, building site development, or recreational development.

This soil is well suited to crops. The flooding, the ponding, runoff from the higher adjacent areas, the wetness, and poor air drainage are management concerns. The most common crops are silage corn, sweet corn, tomatoes, strawberries, and burley tobacco. Properly designed plowing patterns are needed to keep drainage outlets open and to prevent the formation of depressions. Land shaping helps to open outlets and drain surface water from depressions. Grassed field borders and diversions can safely remove runoff. Vegetative field borders can improve water quality and provide wildlife habitat. A tile drainage system is needed to drain surface water from depressions. Irrigation is used to protect high-value crops, such as strawberries and burley tobacco, from frost and to supply additional water. Herbicides may be affected because of the organic matter content in the surface layer.

This soil is well suited to specialty crops, such as landscaping plants and Christmas trees. The flooding, the ponding, the wetness, and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, Bradford pear, and rhododendron. Eastern white pine commonly is grown for use as Christmas trees. The wetness is the main limitation affecting Fraser fir. This soil is well suited to trees and other plants that must be dug during harvesting. Water management practices similar to those used for row crops are appropriate.

This map unit is well suited to pasture and hay. The flooding, the ponding, compaction, the wetness, and damage to streambanks are management concerns. Land shaping before establishing pasture and hay helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can help to prevent damage to streambanks. A tile drainage system is needed in wet spots.

This map unit is poorly suited to building site development because of the flooding, the wetness, the ponding, and runoff from the higher adjacent areas.

This map unit is well suited to commercial timber. It generally is not used for commercial timber because of the small size of the mapped areas and the potentially higher profits from crops, building site development, pasture, or hayland. The most common trees are yellow-poplar, eastern white pine, Virginia pine, and shortleaf pine.

This map unit is moderately suited to recreational uses, such as campsites, parks, picnic areas, and tennis courts. The flooding and the wetness are management concerns.

This map unit is poorly suited to access roads because of the runoff from the higher adjacent areas and the flooding. Elevating the roads during construction minimizes the damage caused by flooding. The roads should be designed so that runoff is diverted. Because unsurfaced roads are soft and slick when wet, surfacing is required for year-round use.

The capability subclass is IIw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7A.

DsB—Dillsboro loam, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Dillsboro and similar soils in slight depressions on high stream terraces. Individual areas are irregular in shape and range from 3 to 20 acres in size.

The typical sequence, depth, and composition of the layers in the Dillsboro soil are as follows—

Surface layer:
0 to 10 inches, dark reddish brown loam

Subsoil:
10 to 43 inches, yellowish red clay loam and clay
43 to 59 inches, strong brown very cobbly clay that has yellowish red and strong brown mottles
59 to 75 inches, yellowish brown very cobbly clay loam that has red and light yellowish brown mottles

Permeability is moderate. The seasonal high water table is more than 6 feet below the surface. The shrink-swell potential is moderate.

Included in mapping are small areas of Saunook and Braddock soils. Saunook soils have a loamy subsoil and are in drainageways. Braddock soils are redder than the Dillsboro soil. They are in eroded, convex areas on high stream terraces. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of Dillsboro soils that have more gravel in the surface layer.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for specialty crops, row crops, recreational development, or building site development.

This soil is well suited to pasture and hay, especially alfalfa. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, increases the runoff rate, and reduces the rate of water infiltration. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is well suited to specialty crops, such as apples, landscaping plants, and Christmas trees. Fraser fir and eastern white pine are grown for use as Christmas trees. The slope and the hazard of erosion are management concerns. Establishing and maintaining sod in appropriate areas helps to conserve water, minimizes erosion, and helps to control runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is well suited to crops. The slope and the severe hazard of erosion are the main management concerns. The most common crops are silage corn, small grain, sweet corn, and strawberries. Irrigation is needed for frost-sensitive crops, such as strawberries. Conservation tillage and crop residue management help to control runoff and erosion. Grassed field borders, grassed waterways, diversions, contour farming, and crop rotations that include close-growing crops also help to conserve soil and water. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is moderately suited to building site development. A high content of clay in the subsoil, the moderate shrink-swell potential, and the severe hazard of erosion during construction are management concerns. A larger septic tank absorption field is needed in some areas because of the high content of clay in the subsoil. In many areas around building sites, severe compaction increases the costs of landscaping.

This map unit is well suited to commercial timber. It is rarely used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland. The most common trees are yellow-poplar, eastern white pine, shortleaf pine, Virginia pine, white oak, scarlet oak, and northern red oak.

This map unit is well suited to recreational uses, such as campsites and picnic areas. It is seldom used for these purposes, however, because the unit is not near streams or does not have adequate shade. The slope and the hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The high content of clay in the subsoil is the main management concern. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is IIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7A.

DsC—Dillsboro loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Dillsboro and similar soils in slight depressions on high stream terraces. Individual areas are irregular in shape and range from 3 to 20 acres in size.

The typical sequence, depth, and composition of the layers in the Dillsboro soil are as follows—

Surface layer:
0 to 10 inches, dark reddish brown loam

Subsoil:
10 to 43 inches, yellowish red clay loam and clay
43 to 59 inches, strong brown very cobbly clay that has yellowish red and strong brown mottles
59 to 75 inches, yellowish brown very cobbly clay

loam that has red and light yellowish brown mottles

Permeability is moderate. The seasonal high water table is more than 6 feet below the surface. The shrink-swell potential is moderate.

Included in mapping are small areas of Saunook and Braddock soils. Saunook soils have a loamy subsoil and are in drainageways. Braddock soils are redder than the Dillsboro soil. They are in eroded, convex areas on high stream terraces. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of Dillsboro soils that have more rocks on the surface.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for specialty crops, row crops, or building site development.

This soil is well suited to pasture and hay, especially alfalfa. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, increases the runoff rate, and reduces the rate of water infiltration. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to specialty crops, such as apples, landscaping plants, and Christmas trees. Fraser fir and eastern white pine are grown for use as Christmas trees. The slope, the high content of clay in the subsoil, and the hazard of erosion are management concerns. Establishing and maintaining sod in appropriate areas helps to conserve water, minimizes erosion, and helps to control runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is moderately suited to crops. The slope and the severe hazard of erosion are the main management concerns. The most common crops are silage corn, small grain, sweet corn, and strawberries. Irrigation is needed for frost-sensitive crops, such as strawberries. Conservation tillage and crop residue management help to control runoff and erosion. Grassed field borders, grassed waterways, diversions, contour farming, and crop rotations that include close-growing crops also help to conserve soil and water. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is only moderately suited to building site development because of the slope, the high content of clay, shrinking and swelling, and the severe hazard of erosion during construction. A larger septic tank absorption field is needed in some areas because of the high content of clay in the subsoil. In many areas around building sites, severe compaction increases the costs of landscaping.

This map unit is well suited to commercial timber. It is rarely used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland. The most common trees are yellow-poplar, eastern white pine, shortleaf pine, Virginia pine, white oak, scarlet oak, and northern red oak.

This map unit is moderately suited to recreational uses, such as campsites and picnic areas. It is rarely used for these purposes, however, because the unit is not near streams and does not have adequate shade. The slope and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, the high content of clay in the subsoil, and the moderate shrink-swell potential are management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is IIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7A.

EdC—Edneyville-Chestnut complex, 8 to 15 percent slopes, stony. This map unit occurs mainly as areas of a very deep Edneyville soil and a moderately deep Chestnut soil. Both soils are well drained. The unit is on strongly sloping, south- to west-facing ridgetops in the intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Edneyville soil are as follows—

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

The typical sequence, depth, and composition of the layers in the Chestnut soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches in the Edneyville soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Edneyville and Chestnut soils. Cowee and Evard soils are redder than the Edneyville and Chestnut soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Edneyville and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for crops or building site development.

This map unit is moderately suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Plott soils. The slope and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, shortleaf pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting. This map unit is well suited to year-round logging.

This map unit is well suited to pasture and hay. Limited access, the slope, and the hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and runoff.

This map unit is moderately suited to crops. The slope, the severe hazard of erosion, and stones are management concerns. In some areas, cabbage and broccoli are grown. Because of the severe hazard of erosion, the high rainfall, and the limited ground cover during the growing season, the unit is highly susceptible to erosion. Contour rows and diversions minimize erosion, conserve water, and help to control runoff. Grassed field borders and grassed waterways can divert water safely around row crops. Vegetative filter strips can improve water quality and provide wildlife habitat. In most areas, stripcropping is not feasible because of the small size of the fields. No-till and minimum tillage can be used instead of conventional tillage in areas where cabbage and broccoli are grown.

This map unit is only moderately suited to specialty crops, such as landscaping plants and Christmas trees, because of the slope, stones, the severe hazard of erosion, and limited access. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is only moderately suited to building site development because of difficult access and the slope. Also, excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil.

This map unit is moderately suited to some recreational uses, such as campsites, overlooks, and hiking trails. Because the unit is on ridgetops, campsites that have a convenient source of water are scarce. The slope, stones, the severe hazard of erosion, and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is moderately suited to access roads. The slope and freezing and thawing are the main management concerns. Revegetating areas that have been cut and filled is difficult. Hydroseeding is a good way to revegetate bare areas.

The capability subclass is IVe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4A in areas of the Edneyville soil and 4D in areas of the Chestnut soil.

EdD—Edneyville-Chestnut complex, 15 to 30 percent slopes, stony. This map unit occurs mainly as areas of a very deep Edneyville soil and a moderately deep Chestnut soil. Both soils are well drained. The unit is on moderately steep, south- to west-facing ridgetops and side slopes in the intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Edneyville soil are as follows—

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

The typical sequence, depth, and composition of the layers in the Chestnut soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches in the Edneyville soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Edneyville and Chestnut soils. Cowee and Evard soils are redder than the Edneyville and Chestnut soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Edneyville and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for crops, building site development, or recreational development.

This map unit is moderately suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Plott soils. The slope and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, shortleaf pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting. This map unit is well suited to year-round logging.

This map unit is poorly suited to pasture and hay because of the slope, limited access, and the severe hazard of erosion. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and runoff. Operating farm equipment is difficult because of the slope.

This map unit is poorly suited to crops. The slope, difficult access across the steep terrain, the severe hazard of erosion, and stones are management

concerns. In some areas, cabbage and broccoli are grown. Because of the severe hazard of erosion, the high rainfall, and the limited ground cover during the growing season, the unit is highly susceptible to erosion. Contour rows and diversions minimize erosion, conserve water, and help to control runoff. Grassed field borders and grassed waterways can divert water safely around row crops. Vegetative filter strips can improve water quality and provide wildlife habitat. In most areas, stripcropping is not feasible because of the small size of the fields. No-till and minimum tillage can be used instead of conventional tillage in areas where cabbage and broccoli are grown.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope, stones, the severe hazard of erosion, and limited access are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, difficult access, and the severe hazard of erosion. Also, excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil.

This map unit is moderately suited to some recreational uses, such as campsites, overlooks, and hiking trails. Campsites that have a dependable source of water are scarce in areas on ridgetops. The slope, stones, the severe hazard of erosion, and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to access roads because of the severe hazard of erosion, freezing and thawing, and the slope. Building and maintaining the roads are difficult and costly. Hydroseeding is a good way to revegetate steep, bare areas.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

EdE—Edneyville-Chestnut complex, 30 to 50 percent slopes, stony. This map unit occurs mainly as areas of a very deep Edneyville soil and a moderately deep Chestnut soil. Both soils are well drained. The unit is on steep, south- to west-facing ridgetops and side slopes in the intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Edneyville soil are as follows—

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

The typical sequence, depth, and composition of the layers in the Chestnut soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches in the Edneyville soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Edneyville and Chestnut soils. Cowee and Evard soils are redder than the Edneyville and Chestnut soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Edneyville and Chestnut soils but have a redder subsoil or have fewer stones on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for

specialty crops, recreational development, or building site development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Plott soils. The slope and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, shortleaf pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting. This map unit is well suited to year-round logging.

This map unit is poorly suited to pasture and is unsuited to hay because of the slope, limited access, and the severe hazard of erosion. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserve water. Operating farm equipment is dangerous.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope, difficult access across the steep terrain, stones, and the severe hazard of erosion are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to recreational uses, such as campsites and hiking trails. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns and increase the need for the trails to be properly maintained.

This map unit is poorly suited to building site development. The slope and the severe hazard of erosion are the main management concerns. Also, excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Chestnut soil.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Building and maintaining the roads are difficult and costly. Hydroseeding is a good way to revegetate steep, bare areas.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

EdF—Edneyville-Chestnut complex, 50 to 95 percent slopes, stony. This map unit occurs mainly as areas of a very deep Edneyville soil and a moderately deep Chestnut soil. Both soils are well drained. The unit is on very steep, south- to west-facing side slopes in the intermediate mountains. Individual areas are irregular in shape and range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Edneyville soil and 20 to 30 percent Chestnut soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Edneyville soil are as follows—

Surface layer:
0 to 5 inches, dark brown gravelly fine sandy loam

Subsoil:
5 to 28 inches, strong brown fine sandy loam
28 to 37 inches, yellowish brown sandy loam that has strong brown and yellow mottles

Underlying material:
37 to 60 inches, multicolored sandy loam saprolite

The typical sequence, depth, and composition of the layers in the Chestnut soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown gravelly fine sandy loam

Subsoil:
3 to 15 inches, strong brown fine sandy loam

Underlying material:
15 to 28 inches, strong brown gravelly sandy loam saprolite

Weathered bedrock:
28 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches in the Edneyville soil, and the depth to weathered bedrock is 20 to 40 inches in the Chestnut soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Chandler, Cowee, Evard, and Plott soils. Chandler soils have more mica than the Edneyville and Chestnut soils. Cowee and Evard soils are redder than the Edneyville and Chestnut soils and have more clay in the subsoil. They are in the low mountains. Plott soils are on north- to east-facing slopes and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Edneyville and Chestnut soils but have a redder subsoil or have fewer rocks on the surface.

Nearly all of the acreage of this map unit is used as woodland. A few areas are used for recreational development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Plott soils. The slope and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, shortleaf pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting. This map unit is well suited to year-round logging.

The slope restricts the kind of equipment that can be used. Generally, operating wheeled and tracked equipment is dangerous. A cable yarding system is safer, results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to recreational uses. The slope and the severe hazard of erosion are the main management concerns. Some areas have scenic vistas and are used for overlooks, and some areas are used for hiking trails. The slope, the severe hazard of erosion, and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hay, and building site development. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep, bare areas.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

EgB2—Ellijay silty clay loam, 2 to 8 percent slopes, eroded. This map unit consists mainly of gently sloping, very deep, well drained Ellijay and similar soils on ridgetops in the low mountains. Individual areas are long and narrow and range from 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers in the Ellijay soil are as follows—

Surface layer:
0 to 4 inches, dusky red silty clay loam

Subsoil:
4 to 34 inches, dark red clay
34 to 52 inches, dark red loam

Underlying material:
52 to 70 inches, mottled yellowish red, reddish yellow, brownish yellow, strong brown, and very pale brown clay loam and loam saprolite

Permeability is moderate. Surface runoff is medium or rapid in areas that have been cleared of trees and slow in wooded areas. This soil has a calcium-magnesium imbalance. Additional calcium from such sources as calcitic limestone or gypsum needs to be applied for the production of most commercial crops. A crust may form on the surface after rainfall, and maintaining good tilth is difficult. Clods form if the soil is worked during wet periods. Crushing the clods is difficult. The crusting and clodding interfere with the germination of seeds.

Included in mapping are small areas of Braddock,

Cowee, and Evard soils. These soils do not have a calcium-magnesium imbalance. Cowee and Evard soils are on the steeper adjacent mountains. They have less clay in the subsoil than the Ellijay soil. Also, Cowee soils are moderately deep to weathered bedrock. Braddock soils are on high stream terraces. They are lighter in color than the Ellijay soil. Also included are small areas of old mines and mine spoil. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Ellijay soil but do not have a dark red subsoil.

Much of the acreage in this map unit is used for building site development. Some areas are used as pasture, hayland, or woodland.

This map unit is moderately suited to building site development. The high content of clay, the severe hazard of erosion, and a moderate shrink-swell potential are management concerns. Because of the calcium-magnesium imbalance, revegetating disturbed areas is difficult. In most areas, supplemental applications of calcium from such sources as calcitic limestone or gypsum are needed to establish and maintain plant cover. A larger septic tank absorption field is needed in some areas because of the high content of clay in the subsoil.

This map unit is only moderately suited to pasture and hay because of the calcium-magnesium imbalance, the slope, and the severe hazard of erosion. Supplemental applications of calcium from such sources as calcitic limestone or gypsum are needed in most areas where plants are becoming established and maintained. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, which increases the runoff rate and reduces the rate of water infiltration.

This map unit is poorly suited to commercial timber. It produces a lower volume of poorer quality timber and has fewer desirable species than other soils on similar landscapes. Tree growth is poor because of the calcium-magnesium imbalance and past management practices. The most common trees are scarlet oak, chestnut oak, black oak, white oak, pitch pine, Virginia pine, post oak, and hickory. Pitch pine and Virginia pine are dominant in areas that are reverting to woodland. This map unit is not managed for commercial timber because of the poor productivity and the potentially higher profits from building sites, pasture, or hayland.

This map unit is well suited to recreational uses, such as campsites, picnic areas, and hiking trails. It is rarely used for campsites or picnic areas, however, because the unit does not have adequate shade and is not near streams. The slope and the severe hazard of erosion are management concerns. The trails are slick during wet periods. Freezing and thawing increase the need for the trails on south- to west-facing slopes to be properly maintained.

This map unit is poorly suited to access roads. The high content of clay in the subsoil, the severe hazard of erosion, and the moderate shrink-swell potential are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is IIIe. Based on Virginia pine as the indicator species, the woodland ordination symbol is 6T.

EgC2—Ellijay silty clay loam, 8 to 15 percent slopes, eroded. This map unit consists mainly of strongly sloping, very deep, well drained Ellijay and similar soils on ridgetops and side slopes in the low mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers in the Ellijay soil are as follows—

Surface layer:
0 to 4 inches, dusky red silty clay loam

Subsoil:
4 to 34 inches, dark red clay
34 to 52 inches, dark red loam

Underlying material:
52 to 70 inches, mottled yellowish red, reddish yellow, brownish yellow, strong brown, and very pale brown clay loam and loam saprolite

Permeability is moderate. Surface runoff is medium or rapid in areas that have been cleared of trees and slow in wooded areas. This soil has a calcium-magnesium imbalance. Additional calcium from such sources as calcitic limestone or gypsum need to be applied for the production of most commercial crops. A crust may form on the surface after rainfall, and maintaining good tilth is difficult. Clods form if the soil is worked during wet periods. Crushing the clods is difficult. The crusting and clodding interfere with the germination of seeds.

Included in mapping are small areas of Braddock, Cowee, and Evard soils. These soils do not have a calcium-magnesium imbalance. Cowee and Evard soils are on the steeper adjacent mountains. They have less clay in the subsoil than the Ellijay soil. Also, Cowee soils are moderately deep to weathered bedrock. Braddock soils are on high stream terraces. They are

lighter in color than the Ellijay soil. Also included are small areas of old mines and mine spoil. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Ellijay soil but do not have a dark red subsoil.

Much of the acreage in this map unit is used for building site development. Some areas are used as pasture, hayland, or woodland.

This map unit is moderately suited to building site development. The slope, the high content of clay, the severe hazard of erosion, and a moderate shrink-swell potential are the main management concerns. Because of the calcium-magnesium imbalance, revegetating disturbed areas is difficult. In most areas, supplemental applications of calcium from such sources as calcitic limestone or gypsum are needed to establish and maintain plant cover. A larger septic tank absorption field is needed in some areas because of the high content of clay in the subsoil.

This map unit is only moderately suited to pasture and hay because of the calcium-magnesium imbalance, the slope, and the severe hazard of erosion. Supplemental applications of calcium from such sources as calcitic limestone or gypsum are needed in most areas where plants are becoming established and maintained. Erosion is a hazard in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, which increases the runoff rate and reduces the rate of water infiltration. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is poorly suited to commercial timber. It produces a lower volume of poorer quality timber and has fewer desirable species than other soils on similar landscapes. Tree growth is poor because of the calcium-magnesium imbalance and past management practices. The most common trees are scarlet oak, chestnut oak, black oak, white oak, pitch pine, Virginia pine, post oak, and hickory. Pitch pine and Virginia pine are dominant in areas that are reverting to woodland. This map unit is not managed for commercial timber because of the poor productivity and the potentially higher profits from building sites, pasture, or hayland.

This map unit is moderately suited to recreational uses, such as campsites, picnic areas, and hiking trails. It is rarely used for campsites or picnic areas, however, because the unit does not have adequate shade and is not near streams. The slope and the severe hazard of erosion are management concerns. The trails are slick during wet periods. Freezing and thawing increase the need for the trails on south- to west-facing slopes to be properly maintained.

This map unit is poorly suited to access roads. The high content of clay, the slope, the severe hazard of erosion, and the moderate shrink-swell potential are management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is IVe. Based on Virginia pine as the indicator species, the woodland ordination symbol is 6T.

EgD2—Ellijay silty clay loam, 15 to 30 percent slopes, eroded. This map unit consists mainly of moderately steep, very deep, well drained Ellijay and similar soils on side slopes in the low mountains. Individual areas are irregular in shape and range from 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers in the Ellijay soil are as follows—

Surface layer:
0 to 4 inches, dusky red silty clay loam

Subsoil:
4 to 34 inches, dark red clay
34 to 52 inches, dark red loam

Underlying material:
52 to 70 inches, mottled yellowish red, reddish yellow, brownish yellow, strong brown, and very pale brown clay loam and loam saprolite

Permeability is moderate. Surface runoff is medium or rapid in areas that have been cleared of trees and slow in wooded areas. This soil has a calcium-magnesium imbalance. Additional calcium from such sources as calcitic limestone or gypsum needs to be applied for the production of most commercial crops. A crust may form on the surface after rainfall, and maintaining good tilth is difficult. Clods form if the soil is worked during wet periods. Crushing the clods is difficult. The crusting and clodding interfere with the germination of seeds.

Included in mapping are small areas of Braddock, Cowee, and Evard soils. These soils do not have a calcium-magnesium imbalance. Cowee and Evard soils are on the steeper adjacent mountains. They have less clay in the subsoil than the Ellijay soil. Also, Cowee soils are moderately deep to weathered bedrock. Braddock soils are on high stream terraces. They are lighter in color than the Ellijay soil. Also included are small areas of old mines and mine spoil. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Ellijay soil but do not have a dark red subsoil.

Much of the acreage in this map unit is used as

pasture or hayland. Some areas are used as woodland or for building site development.

The slope, the calcium-magnesium imbalance, and a severe hazard of erosion are the main management concerns affecting pasture and hayland. Supplemental applications of calcium from such sources as calcitic limestone or gypsum are needed in most areas where plants are becoming established and maintained. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Grazing during wet periods causes severe compaction, which increases the runoff rate and reduces the rate of water infiltration. Operating farm equipment is difficult on this map unit.

This map unit is poorly suited to commercial timber. It produces a lower volume of poorer quality timber and has fewer desirable species than other soils on similar landscapes. Tree growth is poor because of the calcium-magnesium imbalance and past management practices. The most common trees are scarlet oak, chestnut oak, black oak, white oak, pitch pine, Virginia pine, post oak, and hickory. Pitch pine and Virginia pine are dominant in areas that are reverting to woodland. This map unit is not managed for commercial timber because of the poor productivity and the higher profits from building sites, pasture, or hayland.

This map unit is poorly suited to building site development because of the slope, the high content of clay, the severe hazard of erosion, and a moderate shrink-swell potential. Because of the calcium-magnesium imbalance, revegetating disturbed areas is a problem. In most areas, supplemental applications of calcitic limestone or gypsum are needed to establish and maintain plant cover. A larger septic tank absorption field is needed in some areas because of the high content of clay in the subsoil.

This map unit is poorly suited to recreational uses, such as campsites, picnic areas, and hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the high content of clay, and the moderate shrink-swell potential are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the clay subsoil. Frequent smoothing of the road surface is needed because ruts form as a result of the high content of clay.

The capability subclass is VIe. Based on Virginia pine as the indicator species, the woodland ordination symbol is 6R.

EvC—Evard-Cowee complex, 8 to 15 percent slopes. This map unit occurs mainly as areas of a very deep Evard soil and a moderately deep Cowee soil. Both soils are well drained. The unit is on strongly sloping, south- to west-facing ridgetops in the low mountains. Individual areas are long and narrow and range from 5 to 50 acres in size. Typically, they are 50 to 60 percent Evard soil and 20 to 30 percent Cowee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Evard soil are as follows—

Surface layer:
0 to 6 inches, dark brown and strong brown gravelly loam

Subsoil:
6 to 27 inches, red clay loam
27 to 35 inches, mottled red, yellowish red, and strong brown loam

Underlying material:
35 to 60 inches, multicolored sandy loam saprolite

The typical sequence, depth, and composition of the layers in the Cowee soil are as follows—

Surface layer:
0 to 5 inches, reddish brown gravelly sandy loam

Subsoil:
5 to 27 inches, red gravelly sandy loam and gravelly sandy clay loam

Weathered bedrock:
27 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderate in both soils. The depth to bedrock is more than 60 inches in the Evard soil. The depth to weathered bedrock is 20 to 40 inches in the Cowee soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Fannin and Saunook soils. Fannin soils have more mica than the Evard and Cowee soils. Saunook soils are along drainageways and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Evard and Cowee soils but have more clay in the subsoil or are browner in color.

Much of the acreage in this map unit is used as woodland. Other areas are used as pasture or hayland or for specialty crops, recreational development, or building site development.

This map unit is well suited to commercial timber. It

produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Trimont soils. The slope, compaction, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When this map unit is wet, skid trails and unsurfaced roads are soft and slick because of the slope and the content of clay in the subsoil.

This map unit is well suited to pasture and hay. The slope, difficult access across the steep terrain, and the severe hazard of erosion are management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to specialty crops, such as apples, landscaping plants, and Christmas trees. The slope, difficult access across the steep terrain, and the severe hazard of erosion are management concerns. The most common landscaping plants are Norway spruce, mountain laurel, and rhododendron. Eastern white pine is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to building site development. Difficult access across the steep terrain, the slope, and the severe hazard of erosion are the main management concerns. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Cowee soil.

This map unit is moderately suited to some recreational uses, such as campsites and hiking trails. Because the unit is on ridgetops, campsites that have a convenient source of water are scarce. The severe hazard of erosion and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops. The slope, difficult access across the steep terrain, and the severe hazard of erosion are management concerns.

This map unit is moderately suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Because unsurfaced roads are easily eroded and are soft and slick when wet, they should be surfaced and properly maintained for year-round use.

The capability subclass is IVe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4A in areas of the Evard soil and 3D in areas of the Cowee soil.

EvD—Evard-Cowee complex, 15 to 30 percent slopes. This map unit occurs mainly as areas of a very deep Evard soil and a moderately deep Cowee soil. Both soils are well drained. The unit is on moderately steep, south- to west-facing ridgetops and side slopes in the low mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Evard soil and 20 to 30 percent Cowee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Evard soil are as follows—

Surface layer:
0 to 6 inches, dark brown and strong brown gravelly loam

Subsoil:
6 to 27 inches, red clay loam
27 to 35 inches, mottled red, yellowish red, and strong brown loam

Underlying material:
35 to 60 inches, multicolored sandy loam saprolite

The typical sequence, depth, and composition of the layers in the Cowee soil are as follows—

Surface layer:
0 to 5 inches, reddish brown gravelly sandy loam

Subsoil:

5 to 27 inches, red gravelly sandy loam and gravelly sandy clay loam

Weathered bedrock:

27 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderate in both soils. The depth to bedrock is more than 60 inches in the Evard soil. The depth to weathered bedrock is 20 to 40 inches in the Cowee soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Fannin and Saunook soils. Fannin soils have more mica than the Evard and Cowee soils. Saunook soils are along drainageways and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Evard and Cowee soils but have more clay in the subsoil or are browner in color.

Much of the acreage in this map unit is used as woodland. Other areas are used as pasture or hayland or for specialty crops, recreational development, or building site development.

This map unit is moderately suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Trimont soils. The slope, compaction, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When this map unit is wet, skid trails and unsurfaced roads are soft and slick because of the content of clay.

This map unit is moderately suited to pasture and hayland. The slope, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water. Operating farm equipment is difficult on this map unit.

This map unit is moderately suited to specialty crops, such as apples, landscaping plants, and Christmas trees. The slope, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns. The most common landscaping plants are Norway spruce, mountain laurel, and rhododendron. Eastern white pine is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, difficult access across the steep terrain, and the severe hazard of erosion. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Cowee soil.

This map unit is moderately suited to some recreational uses, such as campsites and hiking trails. Campsites that have a dependable source of water are scarce in areas on ridgetops. The slope, the severe hazard of erosion, and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops. The slope, difficult access across the steep terrain, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate bare areas. Because unsurfaced roads are easily eroded and are soft and slick when wet, they should be surfaced and properly maintained for year-round use.

The capability subclass is VIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4R in areas of the Evard soil and 3R in areas of the Cowee soil.

EvE—Evard-Cowee complex, 30 to 50 percent slopes. This map unit occurs mainly as areas of a very deep Evard soil and a moderately deep Cowee soil. Both soils are well drained. The unit is on steep, south- to west-facing ridgetops and side slopes in the low mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 10 to 75 acres in size. Typically, they are 50 to 60 percent Evard soil and 20 to 30 percent Cowee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Evard soil are as follows—

Surface layer:
0 to 6 inches, dark brown and strong brown gravelly loam

Subsoil:
6 to 27 inches, red clay loam
27 to 35 inches, mottled red, yellowish red, and strong brown loam

Underlying material:
35 to 60 inches, multicolored sandy loam saprolite

The typical sequence, depth, and composition of the layers in the Cowee soil are as follows—

Surface layer:
0 to 5 inches, reddish brown gravelly sandy loam

Subsoil:
5 to 27 inches, red gravelly sandy loam and gravelly sandy clay loam

Weathered bedrock:
27 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderate in both soils. The depth to bedrock is more than 60 inches in the Evard soil. The depth to weathered bedrock is 20 to 40 inches in the Cowee soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of contrasting Fannin and Saunook soils. Fannin soils have more mica than the Evard and Cowee soils. Saunook soils are along drainageways and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Evard and Cowee soils but have a browner subsoil or have more rocks on the surface.

Much of the acreage in this map unit is used as woodland. Other areas are used as pasture or hayland or for specialty crops, recreational development, or building site development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Trimont soils. The slope, compaction, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the amount and quantity of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When this map unit is wet, skid trails and unsurfaced roads are soft and slick because of the slope and the content of clay.

This map unit is poorly suited to pasture and is unsuited to hay because of the slope, difficult access across the steep terrain, and the severe hazard of erosion. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserves water. Operating farm equipment is dangerous on this map unit.

This map unit is poorly suited to specialty crops. In some areas, however, specialty crops are grown, especially eastern white pine for use as Christmas trees. The slope and the severe hazard of erosion are management concerns. Operating farm equipment is dangerous on this map unit. Specialty crops generally are planted by hand. A few areas are used for growing Norway spruce, mountain laurel, and rhododendron. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope and the severe hazard of erosion are the main management concerns. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Cowee soil.

This map unit is poorly suited to recreational uses, such as campsites and hiking trails. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns and increase the need for the trails to be properly maintained.

This map unit is unsuited to row crops. The slope and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep, bare areas. Vegetative filter strips can improve water quality and provide wildlife habitat. Because unsurfaced roads are easily eroded and are soft and slick when wet, they should be surfaced and properly maintained for year-round use.

The capability subclass is VIIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4R in areas of the Evard soil and 3R in areas of the Cowee soil.

EvF—Evard-Cowee complex, 50 to 95 percent slopes. This map unit occurs mainly as areas of a very deep Evard soil and a moderately deep Cowee soil. Both soils are well drained. The unit is on steep, south- to west-facing side slopes in the low mountains. Individual areas are irregular in shape and range from 10 to 100 acres in size. Typically, they are 50 to 60 percent Evard soil and 20 to 30 percent Cowee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Evard soil are as follows—

Surface layer:
0 to 6 inches, dark brown and strong brown gravelly loam

Subsoil:
6 to 27 inches, red clay loam
27 to 35 inches, mottled red, yellowish red, and strong brown loam

Underlying material:
35 to 60 inches, multicolored sandy loam saprolite

The typical sequence, depth, and composition of the layers in the Cowee soil are as follows—

Surface layer:
0 to 5 inches, reddish brown gravelly sandy loam

Subsoil:
5 to 27 inches, red gravelly sandy loam and gravelly sandy clay loam

Weathered bedrock:
27 to 60 inches, multicolored, weathered, high-grade metamorphic bedrock

Permeability is moderate in both soils. The depth to bedrock is more than 60 inches in the Evard soil. The depth to weathered bedrock is 20 to 40 inches in the Cowee soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of contrasting Fannin and Saunook soils. Fannin soils have more mica than the Evard and Cowee soils. Saunook soils are along drainageways and have a dark surface layer. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Evard and Cowee soils but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for recreational development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Trimont soils. The slope, compaction, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, yellow-poplar, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the amount and quantity of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of

wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to recreational uses. A few areas are used for hiking trails. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns and increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hay, or building site development. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and freezing and thawing are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep, bare areas. Because unsurfaced roads are easily eroded and are soft and slick when wet, they should be surfaced and properly maintained for year-round use.

The capability subclass is VIIe. Based on chestnut oak as the indicator species, the woodland ordination symbol is 4R in areas of the Evard soil and 3R in areas of the Cowee soil.

FaC—Fannin fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Fannin and similar soils on south- to west-facing ridgetops in the low and intermediate mountains. Individual areas are long and narrow and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Fannin soil are as follows—

Surface layer:

0 to 3 inches, very dark grayish brown fine sandy loam

Subsoil:

3 to 6 inches, strong brown loam

6 to 42 inches, yellowish red sandy clay loam or sandy loam

Underlying material:

42 to 60 inches, yellowish red sandy loam saprolite

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall increases productivity.

Included in mapping are small areas of Cashiers and Chandler soils. These soils are browner than the Fannin soil and have less clay in the subsoil. Cashiers soils are on north- to east-facing ridgetops and have a dark surface layer that is thicker than that of the Fannin soil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Fannin soil but have a browner subsoil or have more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used for pasture, hay, specialty crops, or building site development.

This map unit is well suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, shortleaf pine, northern red oak, Virginia pine, hickory, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the slope, the content of clay in the subsoil, and the very high content of mica.

This map unit is well suited to pasture and hay. The severe hazard of erosion and difficult access across the steep terrain are management concerns. Cool-season grasses grow well because they are dormant in the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely

vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to specialty crops, such as landscaping plants and Christmas trees. The severe hazard of erosion and difficult access across the steep terrain are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is only moderately suited to building site development because of the instability of the saprolite, the severe hazard of erosion, and the slope. Caving of cutbanks is a potential hazard in excavated areas because of the very high content of mica in the underlying material. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to revegetate bare areas.

This map unit is moderately suited to recreational uses, such as hiking trails or campsites. Erosion is a severe hazard. The trails are very slick during rainy periods. Freezing and thawing increase the need for the trails to be properly maintained. Also, because this map unit is on ridgetops, campsites that have a convenient source of water are scarce.

This map unit is unsuited to row crops. The slope, the severe hazard of erosion, and difficult access across the steep terrain are management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate steep, bare areas. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick when wet, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than the soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7A.

FaD—Fannin fine sandy loam, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Fannin and similar soils on south- to west-facing ridgetops and side slopes in the low and intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Fannin soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown fine sandy loam

Subsoil:
3 to 6 inches, strong brown loam
6 to 42 inches, yellowish red sandy clay loam or sandy loam

Underlying material:
42 to 60 inches, yellowish red sandy loam saprolite

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall increases productivity.

Included in mapping are small areas of Cashiers and Chandler soils. These soils are browner than the Fannin soil and have less clay in the subsoil. Cashiers soils are on north- to east-facing ridgetops and side slopes and have a dark surface layer that is thicker than that of the Fannin soil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Fannin soil but have a browner subsoil or have more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used for pasture, hay, specialty crops, or building site development.

This map unit is moderately suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, shortleaf pine, hickory, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the slope, the content of clay in the subsoil, and the very high content of mica.

This map unit is moderately suited to pasture and hay. The severe hazard of erosion and difficult access across the steep terrain are management concerns. Cool-season grasses grow well because they are dormant in the droughty summer months. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope, the severe hazard of erosion, and difficult access across the steep terrain are management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, the instability of the underlying saprolite, and the severe hazard of erosion. Caving of cutbanks is a potential hazard in excavated areas because of the very high content of mica in the underlying material. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to revegetate bare areas.

This map unit is poorly suited to recreational uses. A few areas are used for hiking trails or campsites. Erosion is a severe hazard. The trails are very slick during rainy periods. Freezing and thawing increase the need for the trails to be properly maintained. Also, because this map unit is on ridgetops, convenient sources of water are scarce.

This map unit is unsuited to row crops. The slope, the severe hazard of erosion, and difficult access across the steep terrain are management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate bare areas. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick when wet, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than the soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7R.

FaE—Fannin fine sandy loam, 30 to 50 percent slopes. This map unit consists mainly of steep, very deep, well drained Fannin and similar soils on south- to west-facing ridgetops and side slopes in the low and intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Fannin soil are as follows—

Surface layer:

0 to 3 inches, very dark grayish brown fine sandy loam

Subsoil:

3 to 6 inches, strong brown loam

6 to 42 inches, yellowish red sandy clay loam or sandy loam

Underlying material:

42 to 60 inches, yellowish red sandy loam saprolite

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas

where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall increases productivity.

Included in mapping are small areas of Cashiers and Chandler soils. These soils are browner than the Fannin soil and have less clay in the subsoil. Cashiers soils are on north- to east-facing ridgetops and side slopes and have a dark surface layer that is thicker than that of the Fannin soil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Fannin soil but have a browner subsoil or have more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used for pasture, hay, specialty crops, or building site development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, shortleaf pine, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are very slick because of the slope, the content of clay in the subsoil, and the very high content of mica.

This map unit is poorly suited to pasture and unsuited to hayland. The slope and the severe hazard of erosion are the main management concerns. Cool-season grasses grow well because they are dormant in the droughty summer months. Operating farm equipment is dangerous on this map unit. Generally, weeds are controlled and fertilizer and lime are applied by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. The slope and the severe hazard of erosion are the main management concerns. Operating farm equipment is dangerous on this map unit. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. In the areas of high rainfall, Fraser fir is grown for use as Christmas trees. Eastern white pine is grown in other areas. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development because of the slope, the instability of the underlying saprolite, and the severe hazard of erosion. Caving of cutbanks also is a potential hazard in excavated areas because of the very high content of mica in the underlying material. Revegetating and maintaining bare areas are difficult because of the slope, freezing and thawing, and droughtiness. Hydroseeding is a good way to revegetate bare areas.

This map unit is poorly suited to most recreational uses. Some areas are used for hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during rainy periods. The slope and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to row crops. The slope and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate bare areas. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and

water bars to control runoff and erosion than the soils that have a lower content of mica. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7R.

FaF—Fannin fine sandy loam, 50 to 95 percent slopes. This map unit consists mainly of very steep, very deep, well drained Fannin and similar soils on south- to west-facing side slopes in the low and intermediate mountains. Individual areas are irregular in shape and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Fannin soil are as follows—

Surface layer:
- 0 to 3 inches, very dark grayish brown fine sandy loam

Subsoil:
- 3 to 6 inches, strong brown loam
- 6 to 42 inches, yellowish red sandy clay loam or sandy loam

Underlying material:
- 42 to 60 inches, yellowish red sandy loam saprolite

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The content of mica is very high. Bare areas are highly erodible. In the southern part of the county, high summer rainfall increases productivity.

Included in mapping are small areas of Cashiers and Chandler soils. These soils are browner than the Fannin soil and have less clay in the subsoil. Cashiers soils are on north- to east-facing ridgetops and side slopes and have a dark surface layer that is thicker than that of the Fannin soil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Fannin soil but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for hiking trails and scenic overlooks.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cashiers soils. The slope, the instability of the underlying saprolite, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, yellow-poplar, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, eastern white pine, Virginia pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is unsuited to nearly all recreational uses. A few areas are used for hiking trails and scenic overlooks. The slope and the severe hazard of erosion are the main management concerns. The trails are very slick during rainy periods. The slope and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, hayland, building site development, and crops. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, the instability of the underlying saprolite, freezing and thawing, and difficulty in compacting the soil are the main management concerns. Revegetating and maintaining areas that have been cut and filled are difficult. Hydroseeding is a good way to revegetate bare areas. Because of the very high content of mica, compacting fill material is difficult. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are very slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. This soil requires more culverts, broad-based dips, and water bars to control runoff and erosion than the soils that have a lower content of mica. These measures

allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7R.

HpA—Hemphill clay loam, 0 to 3 percent slopes, rarely flooded. This map unit consists of nearly level, very deep, very poorly drained Hemphill and similar soils in depressions on low stream terraces. Individual areas are long bands near the area of contact between the flood plains and the uplands. They range from 2 to 25 acres in size.

The typical sequence, depth, and composition of the layers in the Hemphill soil are as follows—

Surface layer:

0 to 13 inches, very dark gray clay loam

Subsoil:

13 to 38 inches, dark grayish brown and grayish brown clay and clay loam having yellowish brown and strong brown mottles

38 to 64 inches, light brownish gray loam and fine sandy loam having strong brown and dark yellowish brown mottles

Underlying material:

64 to 80 inches, dark gray fine sandy loam

Permeability is slow. Surface runoff is slow. Crusting increases the hazard of ponding where outlets have been blocked. This soil is rarely flooded for brief periods. The seasonal high water table is at the surface to 1 foot below the surface. This soil has a narrow moisture range for tillage operations. Tillage is extremely difficult when the surface layer is too dry. Large clods form easily when this soil is tilled when it is too wet.

Included in mapping are small areas of Dillard and Nikwasi soils. Dillard soils are moderately well drained. They have less clay than the Hemphill soil and are on elevated knolls. Nikwasi soils are moderately deep to strata of gravel, cobbles, and sand. The strata have more than 35 percent rock fragments. Also, Nikwasi soils are along small streams on flood plains that are subject to frequent flooding. Also included are small areas of somewhat poorly drained soils. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Hemphill soil but have a thinner surface layer or a surface layer that has less clay.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops or as woodland.

This map unit is only moderately suited to pasture and hay because of the wetness, the flooding, the ponding, and runoff from the higher adjacent areas. A drainage system is essential. Installing a tile drainage system is difficult and costly because of the high content of clay in the subsoil, the nearly level slope, and poor outlets. An open ditch drainage system is a better way to drain this soil. Land shaping helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings helps to prevent damage to streambanks.

This map unit is unsuited to crops in undrained areas and is moderately suited in drained areas. The ponding, the wetness, crusting, runoff from the higher adjacent areas, and the flooding are the main management concerns. Large clods form easily if this soil is tilled when it is wet. The most common crops are silage corn, sweet corn, and strawberries. Properly designed plowing patterns are needed to keep drainage outlets open and to prevent the formation of depressions. Water management measures similar to those used for pasture and hayland are used for row crops. Vegetative filter strips can improve water quality and provide wildlife habitat. Some herbicides may be ineffective because of the organic matter content in the surface layer.

This map unit is poorly suited to commercial timber. The wetness, the flooding, and the ponding are the main management concerns. Yellow-poplar is the most common tree. Alder and red maple are dominant in areas that are reverting to woodland. Also, yellow birch, eastern hemlock, and eastern white pine grow on this soil. This soil is rarely used for commercial timber because of the small size of the mapped areas and the potentially higher profits from crops, pasture, or hayland.

This map unit is poorly suited to building site development because of the flooding, the wetness, runoff from the higher adjacent areas, the ponding, and a high shrink-swell potential.

This map unit is poorly suited to recreational uses, such as parks, picnic areas, ball fields, and tennis courts. The wetness, the flooding, and the ponding are the main management concerns. Water management practices similar to those used in pasture and hayland are appropriate.

This map unit is poorly suited to access roads. The flooding, the wetness, runoff from the higher adjacent areas, the ponding, and a high shrink-swell potential are the main management concerns. Because unsurfaced roadbeds are soft and very slick when wet, the roads should be surfaced for year-round use. The roads

should be designed so that runoff from the higher adjacent areas is diverted away from the roadbed. Elevating the roadbeds during construction minimizes the damage caused by flooding.

The capability subclass is VIw in undrained areas and IVw in drained areas. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 6W.

JbD—Junaluska-Brasstown complex, 15 to 30 percent slopes. This map unit occurs mainly as areas of a moderately deep Junaluska soil and a deep Brasstown soil. Both soils are well drained. The unit is on moderately steep, south- to west-facing ridgetops in the low mountains. Individual areas are long and narrow and range from 5 to 50 acres in size. Typically, they are 35 to 45 percent Junaluska soil and 35 to 45 percent Brasstown soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Junaluska soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 13 inches, strong brown channery loam
13 to 28 inches, yellowish red channery clay loam

Weathered bedrock:
28 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

The typical sequence, depth, and composition of the layers in the Brasstown soil are as follows—

Surface layer:
0 to 4 inches, dark brown channery fine sandy loam

Subsoil:
4 to 45 inches, yellowish red and red channery sandy clay loam and clay loam
45 to 50 inches, yellowish red channery fine sandy loam

Weathered bedrock:
50 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

Permeability is moderate in both soils. The depth to weathered bedrock is 20 to 40 inches in the Junaluska soil and 40 to 60 inches in the Brasstown soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Tsali soils in highly dissected areas. These soils are shallow to weathered bedrock. Included soils make up about 10 percent of this map unit.

Also included in mapping are soils that are similar to the Junaluska and Brasstown soils but have a browner subsoil or have more rocks on the surface.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or hayland or for recreational purposes or building site development.

This map unit is moderately suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cheoah soils. The slope, soil compaction, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, northern red oak, shortleaf pine, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover areas, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soils are wet, skid trails and unsurfaced roads are soft and slick because of the slope and the content of clay in the subsoil.

This map unit is only moderately suited to pasture and hay because of the slope, difficult access across the steep terrain, and the severe hazard of erosion. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture and hayland in good condition helps to control erosion and conserves water. Operating farm equipment is difficult on this map unit.

This map unit is poorly suited to building site development because of difficult access across the steep terrain, the slope, and the severe hazard of erosion. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock.

This map unit is moderately suited to some

recreational uses, such as hiking trails or campsites. Campsites on ridgetops that have a dependable source of water are scarce. The slope, freezing and thawing, and the severe hazard of erosion are the main management concerns.

This map unit is unsuited to row crops. The slope, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the depth to weathered bedrock, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope and slumping. Hydroseeding is a good way to revegetate bare areas. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water flowing from exposed seams of these rocks may increase the acidity of streams and kill aquatic life.

The capability subclass is VIe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 3R in areas of the Junaluska soil and 4R in areas of the Brasstown soil.

JbE—Junaluska-Brasstown complex, 30 to 50 percent slopes. This map unit occurs mainly as areas of a moderately deep Junaluska soil and a deep Brasstown soil. Both soils are well drained. The unit is on steep, south- to west-facing ridgetops and side slopes in the low mountains. Individual areas on ridgetops are long and narrow, and individual areas on side slopes are irregular in shape. They range from 5 to 50 acres in size. Typically, they are 35 to 45 percent Junaluska soil and 35 to 45 percent Brasstown soil. The two soils are too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Junaluska soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 13 inches, strong brown channery loam
13 to 28 inches, yellowish red channery clay loam

Weathered bedrock:
28 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

The typical sequence, depth, and composition of the layers in the Brasstown soil are as follows—

Surface layer:
0 to 4 inches, dark brown channery fine sandy loam

Subsoil:
4 to 45 inches, yellowish red and red channery sandy clay loam and clay loam
45 to 50 inches, yellowish red channery fine sandy loam

Weathered bedrock:
50 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

Permeability is moderate in both soils. The depth to weathered bedrock is 20 to 40 inches in the Junaluska soil and 40 to 60 inches in the Brasstown soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Santeetlah, Spivey, and Tsali soils. Santeetlah and Spivey soils are along drainageways and have a dark surface layer. These soils are very deep to weathered bedrock. Also, Spivey soils have more than 35 percent rock fragments in the subsoil. Tsali soils are in highly dissected areas and are shallow to weathered bedrock. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Junaluska and Brasstown soils but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for recreational purposes, such as hiking trails, and a few areas are used for building site development.

This map unit is poorly suited to commercial timber. It produces a lower volume of timber and has fewer desirable species than highly productive soils, such as Cheoah soils. The slope, soil compaction, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, shortleaf pine, northern red oak, and black locust.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover areas cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to Virginia pine, pitch pine, eastern white pine, and black

locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation is not good and hardwood seedlings are not available. In cutover areas, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soils are wet, skid trails and unsurfaced roads are soft and slick because of the slope and the content of clay in the subsoil.

This map unit is poorly suited to building site development because of the slope, the severe hazard of erosion, and difficult access across the steep terrain. Excavations for dwellings with basements and the installation of septic tank absorption fields are hampered by the depth to weathered bedrock in areas of the Junaluska soil.

This map unit is unsuited to most recreational uses. A few areas are used for hiking trails. The slope, freezing and thawing, and the severe hazard of erosion are management concerns.

This map unit is unsuited to crops and hay and is poorly suited to pasture. The slope, difficult access across the steep terrain, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the depth to weathered bedrock, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope and slumping. Hydroseeding is a good way to revegetate bare areas. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

The capability subclass is VIIe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 3R in areas of the Junaluska soil and 4R in areas of the Brasstown soil.

JtD—Junaluska-Tsali complex, 15 to 30 percent slopes. This map unit occurs mainly as areas of a moderately deep, well drained Junaluska soil and a shallow, well drained Tsali soil. The unit is on moderately steep, south- to west-facing ridgetops in the low mountains. Individual areas are long and narrow and range from 10 to 25 acres in size. Typically, they are 60 to 70 percent Junaluska soil and 20 to 30 percent Tsali soil. The two soils are too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Junaluska soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 13 inches, strong brown channery loam
13 to 28 inches, yellowish red channery clay loam

Weathered bedrock:
28 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

The typical sequence, depth, and composition of the layers in the Tsali soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 6 inches, brown channery fine sandy loam
6 to 16 inches, yellowish red channery loam

Weathered bedrock:
16 to 40 inches, multicolored, weathered, fractured metasedimentary bedrock

Permeability is moderate in both soils. The depth to weathered bedrock is 20 to 40 inches in the Junaluska soil and 10 to 20 inches in the Tsali soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Brasstown soils. These soils are deep to weathered bedrock and are on the widest part of the ridgetops. Also included are areas of soils that have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Junaluska and Tsali soils but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor recreational purposes, such as hiking trails and campsites.

This map unit is poorly suited to commercial timber The slope, the depth to bedrock, and the severe hazard

of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, white oak, shortleaf pine, black oak, northern red oak, and hickory.

Eastern white pine generally is preferred for commercial timber. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. During wet periods, skid trails and unsurfaced roads are soft, slick, and dangerous because of the content of clay in the subsoil and the slope.

This map unit is poorly suited to recreational uses, such as hiking trails and campsites. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns. Because this map unit is on ridgetops, campsites that have a convenient source of water are rare. The trails are slick during wet periods. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, building site development, and crops. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the depth to bedrock, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope, freezing and thawing, and slumping. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 3R in areas of the Junaluska soil and 2D in areas of the Tsali soil.

JtE—Junaluska-Tsali complex, 30 to 50 percent slopes. This map unit occurs mainly as areas of a moderately deep, well drained Junaluska soil and a shallow, well drained Tsali soil. The unit is on steep, south- to west-facing ridgetops and side slopes in the low mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 10 to 25 acres in size. Typically, they are 60 to 70 percent Junaluska soil and 20 to 30 percent Tsali soil. The two soils are too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Junaluska soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 13 inches, strong brown channery loam
13 to 28 inches, yellowish red channery clay loam

Weathered bedrock:
28 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

The typical sequence, depth, and composition of the layers in the Tsali soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 6 inches, brown channery fine sandy loam
6 to 16 inches, yellowish red channery loam

Weathered bedrock:
16 to 40 inches, multicolored, weathered, fractured metasedimentary bedrock

Permeability is moderate in both soils. The depth to weathered bedrock is 20 to 40 inches in the Junaluska soil and 10 to 20 inches in the Tsali soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Brasstown soils. These soils are deep to weathered bedrock and are on the widest part of the ridgetops. Also included are areas of soils that have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Junaluska and Tsali soils but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for outdoor

recreational purposes, such as hiking trails.

This map unit is poorly suited to commercial timber. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, white oak, shortleaf pine, black oak, northern red oak, and hickory.

Eastern white pine generally is preferred for commercial timber. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. During wet periods, skid trails and unsurfaced roads are soft, slick, and dangerous because of the content of clay in the subsoil and the slope.

This map unit is poorly suited to recreational uses, such as hiking trails. The slope and the severe hazard of erosion are the main management concerns. The trails are slick during wet periods. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, building site development, and crops. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope, freezing and thawing, and slumping. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is thinly bedded and is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic (fig. 12). Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIIe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 3R in areas of the Junaluska soil and 2R in areas of the Tsali soil.

JtF—Junaluska-Tsali complex, 50 to 95 percent slopes. This map unit occurs mainly as areas of a moderately deep, well drained Junaluska soil and a shallow, well drained Tsali soil. The unit is on very steep, south- to west-facing side slopes in the low mountains. Individual areas are irregular in shape. They range from 10 to 75 acres in size. Typically, they are 60 to 70 percent Junaluska soil and 20 to 30 percent Tsali soil. The two soils are too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Junaluska soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 13 inches, strong brown channery loam
13 to 28 inches, yellowish red channery clay loam

Weathered bedrock:
28 to 60 inches, multicolored, weathered, fractured metasedimentary bedrock

The typical sequence, depth, and composition of the layers in the Tsali soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery fine sandy loam

Subsoil:
3 to 6 inches, brown channery fine sandy loam
6 to 16 inches, yellowish red channery loam

Weathered bedrock:
16 to 40 inches, multicolored, weathered, fractured metasedimentary bedrock

Permeability is moderate in both soils. The depth to weathered bedrock is 20 to 40 inches in the Junaluska soil and 10 to 20 inches in the Tsali soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Brasstown soils. These soils are deep to weathered bedrock and are on the widest part of the ridgetops. Also included are areas of soils that have more than 35 percent rock fragments and weathered bedrock at a depth of less than 10 inches. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Junaluska and Tsali soils but have a browner subsoil or have more rocks on the surface.

Nearly all of the acreage in this map unit is used as

Figure 12.—An area of thinly bedded, unstable, low-grade metasedimentary bedrock underlying Junaluska-Tsali complex, 30 to 50 percent slopes, that is very susceptible to landslides.

woodland. A few areas are used for hiking trails.

This map unit is poorly suited to commercial timber. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns. The most common trees are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, white oak, shortleaf pine, black oak, northern red oak, and hickory.

Eastern white pine generally is preferred for commercial timber. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to most recreational uses. A few areas are used for hiking trails. The slope, the depth to bedrock, and the severe hazard of erosion are management concerns. The trails are slick during wet periods. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to pasture, building site development, and crops. The slope, the depth to bedrock, and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope and slumping and repeated freezing and thawing on south- to west-facing slopes. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIIe. Based on scarlet oak as the indicator species, the woodland ordination symbol is 3R in areas of the Junaluska soil and 2R in areas of the Tsali soil.

NkA—Nikwasi fine sandy loam, 0 to 2 percent slopes, frequently flooded. This map unit consists mainly of nearly level, poorly drained and very poorly drained Nikwasi and similar soils that are very deep to bedrock and moderately deep to strata of gravel, cobbles, and sand. The strata have more than 35 percent rock fragments. The unit is in depressions on flood plains along small streams. Individual areas are long and narrow bands and range from 2 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Nikwasi soil are as follows—

Surface layer:

0 to 26 inches, very dark grayish brown and very dark gray fine sandy loam

Underlying material:

26 to 60 inches, dark grayish brown and multicolored extremely gravelly coarse sand

Permeability is moderately rapid in the upper layers and rapid in the underlying material. Surface runoff is very slow or ponded. The soil is frequently flooded for very brief periods. The seasonal high water table is at the surface to 1 foot below the surface.

Included in mapping are small areas of Cullowhee, Dellwood, and Reddies soils. Cullowhee soils are somewhat poorly drained and are in slight depressions. Dellwood soils are moderately well drained and have more than 35 percent rock fragments in the subsoil. These soils are in areas scoured by floodwaters. Reddies soils are moderately well drained and are on small elevated knolls. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Nikwasi soil but have a thinner surface layer or have 4 to 10 inches of light colored, recent overwash near the area of contact between the flood plains and the uplands.

Most of the acreage in this map unit is used as pasture. Some areas are used as woodland or are abandoned cropland that is reverting to woodland.

This map unit is poorly suited to pasture in undrained areas and is moderately suited to pasture or hayland in drained areas. Where drained, it is commonly used for pasture in nearly level areas that have easy access. The flooding, the wetness, the ponding, soil compaction, runoff from the higher adjacent areas, and damage to streambanks are serious management concerns. A tile drainage system is difficult and costly to install because of the shallowness to extremely gravelly

Figure 13.—Operating equipment for harvesting timber is difficult during wet periods on Nikwasi fine sandy loam, 0 to 2 percent slopes, frequently flooded.

layers, the nearly level slope, and limited outlets. Land shaping helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can minimize damage to streambanks.

This map unit is unsuited to crops because of the flooding, the wetness, and the ponding. Also, cultivating this soil is difficult when it is wet.

This map unit is poorly suited to commercial timber. The flooding, the wetness, and the ponding are the main management concerns (fig. 13). The most common trees in wooded areas are yellow-poplar, eastern white pine, sweet birch, yellow birch, American sycamore, and eastern hemlock. Alder and red maple are dominant in areas that are reverting to woodland. Plant competition is severe. In cutover stands the dense understory of rhododendron is very difficult to control.

This soil produces an excellent crop of hardwoods or eastern white pine if managed properly. Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. Reforestation of hardwoods

occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts.

In previously cleared areas eastern white pine can be successfully established. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs.

Care is needed to prevent soil compaction by heavy equipment during site preparation, management, and harvesting. The use of heavy equipment should be restricted to dry periods or to periods when the ground is frozen. When the soil is wet, skid trails and unsurfaced roads are very slick because of the wetness and the organic matter content in the surface layer.

This map unit is poorly suited to recreational uses because of the flooding, the wetness, and the ponding. Water management practices similar to those used in pasture management are appropriate.

This map unit is poorly suited to access roads. The flooding, the wetness, runoff from the higher adjacent areas, and the ponding are the main management concerns. Elevating the roads during construction provides a suitable roadbed and minimizes the damage caused by flooding. The roadbeds should be designed so that runoff is diverted.

The capability subclass is VIw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 6W.

OcD—Oconaluftee channery loam, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Oconaluftee and similar soils on ridgetops in the high mountains. Individual areas are long and narrow and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers in the Oconaluftee soil are as follows—

Surface layer:
0 to 19 inches, black and dark brown channery loam

Subsoil:
19 to 35 inches, dark yellowish brown channery fine sandy loam

Underlying material:
35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. Some areas are used for outdoor recreational purposes, such as campsites, hiking trails, and scenic overlooks. A few areas are in grassy balds or heath balds. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This map unit is only moderately suited to commercial timber. The slope, the climate, and a severe hazard of erosion are the main management concerns. Productivity is reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, sweet birch, eastern hemlock, yellow buckeye, American beech, and black oak at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black

cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester.

Restricting the use of heavy equipment to dry periods helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is moderately suited to some recreational uses. Overlooks and hiking trails are the major uses. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hayland, and building site development. The slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Outsloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIe. Based on red spruce as the indicator species, the woodland ordination symbol is 10R.

OcE—Oconaluftee channery loam, 30 to 50 percent slopes. This map unit consists mainly of steep, very deep, well drained Oconaluftee and similar soils on side slopes and ridgetops in the high mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. Individual areas range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Oconaluftee soil are as follows—

Surface layer:

0 to 19 inches, black and dark brown channery loam

Subsoil:

19 to 35 inches, dark yellowish brown channery fine sandy loam

Underlying material:

35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. Some areas are used for outdoor recreational purposes, such as hiking trails and scenic overlooks. A few areas are in grassy balds or heath balds. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This soil is poorly suited to commercial timber. The slope, the climate, and the severe hazard of erosion are the main management concerns. The productivity is reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some

of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, sweet birch, eastern hemlock, yellow buckeye, American beech, and black oak at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and various environmental factors. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester.

Restricting the use of heavy equipment to dry periods helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to outdoor recreational uses. Some areas, however, are used for hiking trails and scenic overlooks. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hayland, or building site development. The slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

The capability subclass is VIIe. Based on red spruce as the indicator species, the woodland ordination symbol is 10R.

OcF—Oconaluftee channery loam, 50 to 95 percent slopes. This map unit consists mainly of very steep, very deep, well drained Oconaluftee and similar soils on side slopes in the high mountains. Individual areas are irregular in shape and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers in the Oconaluftee soil are as follows—

Surface layer:
0 to 19 inches, black and dark brown channery loam

Subsoil:
19 to 35 inches, dark yellowish brown channery fine sandy loam

Underlying material:
35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface

layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. A few areas are used for outdoor recreational purposes, such as hiking trails and scenic overlooks. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This map unit is poorly suited to commercial timber. The slope, the climate, and a severe hazard of erosion are the main management concerns. The productivity is reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, sweet birch, eastern hemlock, yellow buckeye, American beech, and black oak at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to most recreational uses. A few areas are used for overlooks and hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is not suited to crops, pasture, hayland, and building site development because of the slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Outsloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

The capability subclass is VIIe. Based on red spruce as the indicator species, the woodland ordination symbol is 10R.

OwD—Oconaluftee channery loam, windswept, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Oconaluftee and similar soils on ridgetops in the high mountains. Individual areas are long and narrow and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers in the Oconaluftee soil are as follows—

Surface layer:

0 to 19 inches, black and dark brown channery loam

Subsoil:

19 to 35 inches, dark yellowish brown channery fine sandy loam

Underlying material:

35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey

soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. Some areas are used for outdoor recreational purposes, such as campsites, hiking trails, and scenic overlooks. A few areas are in grassy balds or heath balds. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. Limited access and a severe hazard of erosion also are management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is moderately suited to outdoor recreational uses, such as hiking trails, campsites, and scenic overlooks. The slope and the severe hazard of erosion are the main management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hayland, and building site development because of the slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Outsloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use. The cold temperatures and frequent ice storms in winter increase the costs of maintaining the roads.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

OwE—Oconaluftee channery loam, windswept, 30 to 50 percent slopes. This map unit consists mainly of steep, very deep, well drained Oconaluftee and similar soils on ridgetops and side slopes in the high mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers in the Oconaluftee soil are as follows—

Surface layer:
0 to 19 inches, black and dark brown channery loam

Subsoil:
19 to 35 inches, dark yellowish brown channery fine sandy loam

Underlying material:
35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar

to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. Some areas are used for outdoor recreational purposes, such as campsites, hiking trails, and scenic overlooks. A few areas are in grassy balds or heath balds. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, limited access, and a severe hazard of erosion are also management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to outdoor recreational uses. Some areas, however, are used for hiking trails or scenic overlooks. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hayland, and building site development. The slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Outsloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use. The cold temperatures and frequent ice storms in winter increase the costs of maintaining the roads.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

OwF—Oconaluftee channery loam, windswept, 50 to 95 percent slopes. This map unit consists mainly of very steep, very deep, well drained Oconaluftee and similar soils on side slopes in the high mountains. Individual areas are irregular in shape and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers in the Oconaluftee soil are as follows—

Surface layer:
0 to 19 inches, black and dark brown channery loam

Subsoil:
19 to 35 inches, dark yellowish brown channery fine sandy loam

Underlying material:
35 to 67 inches, olive brown, white, gray, and black channery fine sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed from high-grade metamorphic bedrock. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Wayah soils are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. These soils are similar to the Oconaluftee soil in appearance. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Oconaluftee soil but have a dark surface layer that

is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Much of the acreage in this map unit is wooded. Some areas are used for outdoor recreational purposes, such as hiking trails and scenic overlooks. Nearly all of this map unit is in the Cherokee Indian Reservation or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concern is the harsh climate, which is characterized by high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, limited access, and a severe hazard of erosion are also management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to recreational uses. Some areas, however, are used for hiking trails or scenic overlooks. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing in spring and fall and frequent ice storms in winter increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hayland, and building site development. The slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and the instability of the underlying saprolite are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas. Building the roadbeds on the natural soil, where possible, minimizes slumping. Outsloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use. Freezing and thawing in spring and fall and frequent ice storms in winter increase the costs of maintaining the roads.

The underlying saprolite is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

Pt—Pits, quarries. This map unit consists of areas where the soil has been removed and the underlying bedrock has been mined and crushed for use as road base or olivine. Individual areas are 10 to 25 acres in size.

The pits are excavated areas that consist of vertical sidewalls and local mounding of rock rubble in their floors. The pit cuts range to as much as 175 feet deep. Some mounding of the rock rubble is adjacent to the excavated pits. In some places small areas of water are in the pits.

The exposed rock material cannot support significant plant growth.

Onsite investigation is needed before planning the reclamation and use of areas in this map unit.

The capability subclass is VIIIs. This unit has not been assigned a woodland ordination symbol.

PwD—Plott fine sandy loam, 15 to 30 percent slopes, stony. This map unit consists mainly of moderately steep, very deep, well drained Plott and similar soils. The unit generally is on north- to east-facing ridgetops and also on south- to west-facing ridgetops shaded by the higher mountains. Individual areas are long and narrow and range from 10 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Plott soil are as follows—

Surface layer:

0 to 12 inches, very dark grayish brown fine sandy loam and dark brown gravelly fine sandy loam

Subsoil:

12 to 26 inches, dark yellowish brown gravelly loam and cobbly fine sandy loam

26 to 36 inches, yellowish brown cobbly fine sandy loam

Underlying material:

36 to 45 inches, light yellowish brown cobbly sandy loam saprolite

45 to 60 inches, multicolored cobbly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow

in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Chestnut and Edneyville soils. These soils are on south- to west-facing slopes. They have a surface layer that is thinner or lighter in color than that of the Plott soil. Also, Chestnut soils are moderately deep to weathered bedrock. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Plott soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for hay, specialty crops, recreational development, or building site development.

This map unit is moderately suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for management concerns, such as the slope, plant competition, and the hazard of erosion. The most common trees are northern red oak, black cherry, sweet birch, and sugar maple. Yellow-poplar is the most common tree on previously cleared sites at elevations below 4,000 feet. Yellow birch, American beech, and eastern hemlock are the most common trees at elevations above 4,000 feet. Scarlet oak, white oak, black oak, and hickory are the most common trees on severely high-graded sites.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine is commonly planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is moderately suited to pasture and hayland. The slope, stones on the surface, and a severe hazard of erosion are the main management concerns. Operating farm equipment is difficult on this map unit. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Cool-season grasses, such as tall fescue and orchardgrass, can provide good late-season pasture and hay when managed properly. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to specialty crops, such as landscaping plants and Christmas trees. The slope, limited access across the steep terrain, the severe hazard of erosion, and stones on the surface are management concerns. Operating farm equipment is difficult on this map unit. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, and rhododendron. Fraser fir is grown for use as Christmas trees. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope, the severe hazard of erosion, and limited access across the steep terrain are the main management concerns. The cold temperatures in winter increase the costs of utilities and maintenance and reduce the potential for year-round homes. Revegetating disturbed areas is difficult because of the slope and the severe hazard of erosion. Hydroseeding is an excellent way to establish vegetation in steep, bare areas.

This map unit is poorly suited to recreational uses. Some areas, however, are used for scenic overlooks and hiking trails. The slope, stones on the surface, and the severe hazard of erosion are management concerns.

This map unit is unsuited to row crops because of the slope and difficult access across the steep terrain.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and stones on the surface are the main management concerns. Revegetating large areas that have been cut and filled is very difficult. Hydroseeding is a good way to

revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 5R.

PwE—Plott fine sandy loam, 30 to 50 percent slopes, stony. This map unit consists mainly of steep, very deep, well drained Plott and similar soils. The unit is on north- to east-facing side slopes or ridgetops in the intermediate mountains and is also on south- to west-facing slopes shaded by the higher mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. They range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Plott soil are as follows—

Surface layer:

0 to 12 inches, very dark grayish brown fine sandy loam and dark brown gravelly fine sandy loam

Subsoil:

12 to 26 inches, dark yellowish brown gravelly loam and cobbly fine sandy loam

26 to 36 inches, yellowish brown cobbly fine sandy loam

Underlying material:

36 to 45 inches, light yellowish brown cobbly sandy loam saprolite

45 to 60 inches, multicolored cobbly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Chestnut, Edneyville, Cullasaja, and Tuckasegee soils. Chestnut and Edneyville soils are on south- to west-facing slopes. They have a surface layer that is thinner or lighter in color than that of the Plott soil. Also, Chestnut soils are moderately deep to weathered bedrock. Cullasaja and Tuckasegee soils are in drainageways. Also, Cullasaja soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of rock outcrop near the ridgetops. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Plott soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles or on the lower side slopes.

Much of the acreage in this map unit is wooded. Some areas are used as pasture or for specialty crops, recreational development, or building site development.

This map unit is poorly suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for management concerns, such as the slope, plant competition, and a severe hazard of erosion. The most common trees are northern red oak, black cherry, sweet birch, and sugar maple. Yellow-poplar is the most common tree on previously cleared sites at elevations below 4,000 feet. Yellow birch, American beech, and eastern hemlock are the most common trees at elevations above 4,000 feet. Scarlet oak, white oak, black oak, and hickory are the most common trees on severely high-graded sites.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine is commonly planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to pasture. The slope, stones on the surface, and a severe hazard of erosion are the main management concerns. Operating farm

equipment is dangerous on this map unit. Most farming operations are done by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Cool-season grasses, such as tall fescue and orchardgrass, can provide good late-season pasture when managed properly. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is poorly suited to specialty crops, such as landscaping plants and Christmas trees. In some areas, however, Fraser fir is grown for use as Christmas trees. The high productivity helps to compensate for management concerns, such as the slope, stones on the surface, and the severe hazard of erosion. Operating farm equipment is dangerous on this map unit. Most farming operations are done by hand. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope and the severe hazard of erosion are the main management concerns. The cold temperatures in winter increase the costs of utilities and maintenance and reduce the potential for year-round homes. Because the slopes are too steep to operate equipment safely, septic tank absorption fields generally are dug by hand. Revegetating disturbed areas is difficult because of the slope and the very severe hazard of erosion. Hydroseeding is an excellent way to establish vegetation in steep, bare areas.

This map unit is poorly suited to recreational uses. Some areas are used for scenic overlooks and hiking trails. The slope, stones on the surface, and the severe hazard of erosion are management concerns.

This map unit is unsuited to row crops and hay because of the slope.

This map unit is poorly suited to access roads. The slope, stones on the surface, and the severe hazard of erosion are the main management concerns. Revegetating large areas that have been cut and filled is very difficult. Hydroseeding is a good way to revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 5R.

PwF—Plott fine sandy loam, 50 to 95 percent slopes, stony. This map unit consists mainly of very steep, very deep, well drained Plott and similar soils. The unit is on north- to east-facing side slopes in the intermediate mountains and is also on south- to west-facing slopes shaded by the higher mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Plott soil are as follows—

Surface layer:

0 to 12 inches, very dark grayish brown fine sandy loam and dark brown gravelly fine sandy loam

Subsoil:

12 to 26 inches, dark yellowish brown gravelly loam and cobbly fine sandy loam

26 to 36 inches, yellowish brown cobbly fine sandy loam

Underlying material:

36 to 45 inches, light yellowish brown cobbly sandy loam saprolite

45 to 60 inches, multicolored cobbly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Chestnut, Edneyville, Cullasaja, and Tuckasegee soils. Chestnut and Edneyville soils are on south- to west-facing slopes. They have a surface layer that is thinner or lighter in color than that of the Plott soil. Also, Chestnut soils are moderately deep to weathered bedrock. Cullasaja and Tuckasegee soils are in drainageways. Also, Cullasaja soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of rock outcrop and seeps near the ridgetops. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Plott soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles or on the lower side slopes.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for scenic overlooks or hiking trails.

This map unit is poorly suited to commercial timber. The unit is desirable for timber production, however,

because of the high productivity of commercial species, which helps to compensate for management concerns, such as the slope, stones on the surface, plant competition, and a severe hazard of erosion. The most common trees are northern red oak, black cherry, sweet birch, and sugar maple. Yellow-poplar is the most common tree on previously cleared sites at elevations below 4,000 feet. Yellow birch, American beech, and eastern hemlock are the most common trees at elevations above 4,000 feet. Scarlet oak, white oak, black oak, and hickory are the most common trees on severely high-graded sites.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry and northern red oak generally are left standing.

Eastern white pine is commonly planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to recreational uses. A few areas are used for scenic overlooks and hiking trails. The slope, stones on the surface, and the severe hazard of erosion are management concerns.

This map unit is unsuited to pasture, hay, crops, and building site development. The slope, the severe hazard of erosion, and the cold weather in winter are the main management concerns.

This map unit is poorly suited to access roads. The slope, the severe hazard of erosion, and stones on the surface are the main management concerns. Revegetating large areas that have been cut and filled is very difficult. Hydroseeding is a good way to revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping. Because unsurfaced roadbeds are easily eroded and are slick, the roads should be surfaced and properly maintained for year-round use. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. These measures allow water to be removed more often and in smaller amounts.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 5R.

RdA—Reddies fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This map unit consists mainly of nearly level, moderately well drained Reddies and similar soils that are very deep to bedrock and moderately deep to strata of gravel, cobbles, and sand. The strata are more than 35 percent rock fragments. The unit is on slightly elevated knolls on flood plains along the smaller streams. Individual areas are long bands next to the stream channels. They range from 1 to 25 acres in size.

The typical sequence, depth, and composition of the layers in the Reddies soil are as follows—

Surface layer:

0 to 14 inches, dark brown fine sandy loam

Subsoil:

14 to 26 inches, dark yellowish brown fine sandy loam

Underlying material:

26 to 41 inches, dark yellowish brown very gravelly sand

41 to 60 inches, multicolored very gravelly sand

Permeability is moderately rapid in the surface layer and subsoil and rapid and very rapid in the underlying material. Surface runoff is slow. The soil is occasionally flooded for very brief periods. The seasonal high water table is 2.0 to 3.5 feet below the surface.

Included in mapping are small areas of Cullowhee, Dellwood, Nikwasi, and Rosman soils. Cullowhee and Nikwasi soils are in depressions. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. Dellwood soils have more than 35 percent rock fragments in the subsoil. They are in areas that have a very uneven surface resulting from scouring by floodwaters. Rosman soils are more than 40 inches thick over strata of gravel, cobbles, and sand. They generally are along the larger streams. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Reddies soil but have a thinner or lighter colored surface layer or a redder subsoil.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for specialty crops or row crops or as woodland.

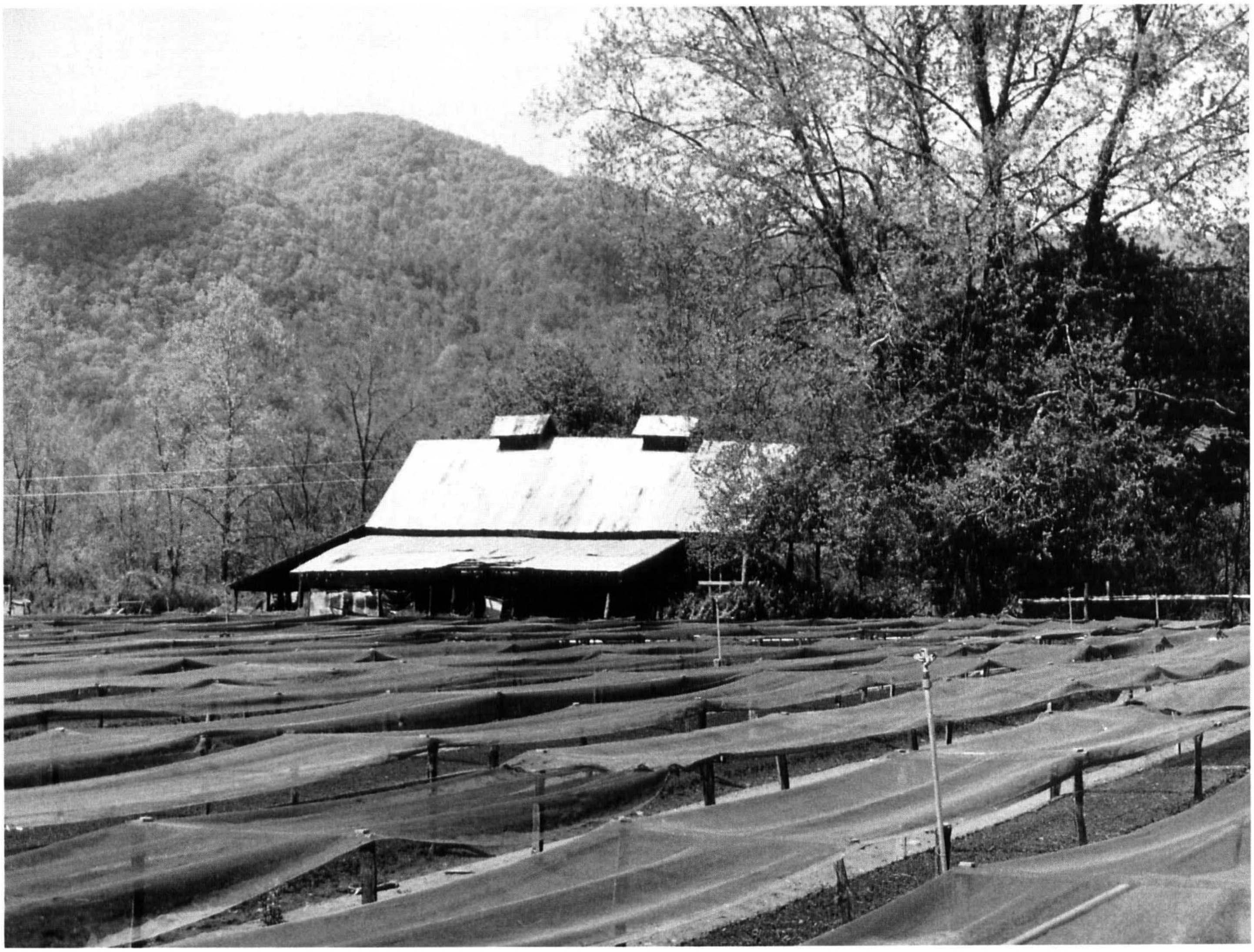

Figure 14.—Native ornamentals growing under shade cloth on Reddies fine sandy loam, 0 to 2 percent slopes, occasionally flooded.

This map unit is well suited to pasture and hay. The flooding, the wetness, and soil compaction are the main management concerns. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can help to minimize damage to streambanks.

This map unit is moderately suited to specialty crops, such as landscaping plants and Christmas trees. The flooding is the main hazard. The soil is desirable for growing and harvesting bare-rooted seedlings, such as Fraser fir and dog hobble, because it has a loamy surface layer, is nearly level, and is near streams that supply additional water for irrigation (fig. 14). Digging, balling, and burlapping landscaping plants and Christmas trees are easy during harvesting. Irrigation is necessary to overcome droughtiness, to cool the crop on hot days, and to saturate the soil before harvesting. Land shaping helps to smooth the surface and improves the efficiency of irrigation. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees. Diversions can be used to safely divert runoff. Vegetative filter strips can improve water quality and provide wildlife habitat.

This map unit is moderately suited to cropland. The flooding and runoff from the higher adjacent areas are the main management concerns. Poor air drainage in

most areas of this soil is also a management concern affecting frost-sensitive crops. The most common crops are silage corn, sweet corn, tomatoes, strawberries, and burley tobacco. Split applications of fertilizer are needed because nutrients are easily leached. Land shaping helps to open outlets and drain surface water from depressions. Vegetative filter strips can improve water quality and provide wildlife habitat. Irrigation is needed during dry periods in the growing season and to protect sensitive crops, such as strawberries and tomatoes, from frost. Herbicides may be adversely affected by the organic matter content in the surface layer.

This map unit is poorly suited to building site development. The flooding and the wetness are the main management concerns.

This map unit is well suited to commercial timber. It is not used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, pasture, or hayland. The most common trees are yellow-poplar, American sycamore, red maple, eastern white pine, and river birch. The flooding is the main hazard.

This map unit is poorly suited to recreational uses. The flooding and the wetness are the main management concerns. Because this soil is nearly level and is near streams, some areas are used for campsites, parks, picnic areas, and ball fields.

This map unit is poorly suited to access roads. The flooding, runoff from the higher adjacent areas, and the wetness are the main management concerns. Elevating the roads during construction minimizes the damage caused by flooding and wetness. The roads should be designed so that runoff is properly diverted.

The capability subclass is IIw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A.

RkF—Rock outcrop-Cleveland complex, windswept, 30 to 95 percent slopes. This map unit occurs mainly as areas of Rock outcrop and a steep and very steep, shallow, somewhat excessively drained Cleveland soil. The unit is on side slopes in the intermediate mountains. In most areas crossing the landscape is difficult and dangerous. Individual areas are irregular in shape and range from 20 to 100 acres in size. Typically, they are 50 to 60 percent Rock outcrop and 25 to 35 percent Cleveland soil. The Rock outcrop and the Cleveland soil occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Cleveland soil are as follows—

Surface layer:
0 to 5 inches, black sandy loam

Subsoil:
5 to 17 inches, yellowish brown loam

Hard bedrock:
17 inches, hard granodiorite bedrock

Permeability is moderately rapid in the Cleveland soil. The depth to bedrock is 10 to 20 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. Available water capacity is low. Landslides are common during prolonged periods of heavy rainfall.

Included in mapping are small areas of Chandler, Chestnut, Plott, and Cullasaja soils. Chandler, Plott, and Cullasaja soils are very deep to weathered bedrock. Chestnut soils are moderately deep to weathered bedrock. Chandler soils have more mica than the Cleveland soil. Plott and Cullasaja soils have a dark surface layer that is thicker than that of the Cleveland soil. Cullasaja soils have more than 35 percent rock fragments in the subsoil. Also included are small areas of rubble land below rock cliffs. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Cleveland soil but have a redder subsoil or more rocks on the surface.

Nearly all of the acreage in this map unit is wooded. Many areas are used for scenic overlooks.

This map unit is unsuited to commercial timber. The large areas of exposed bedrock, the severe windthrow hazard, and the slope are the main management concerns. Also, this map unit is subject to strong winds in the winter and severe ice storms that stunt, twist, or otherwise damage the trees. The most common trees on south- to west-facing slopes are scarlet oak, chestnut oak, eastern white pine, pitch pine, Virginia pine, and hickory. The most common trees on north- to east-facing slopes are northern red oak, sweet birch, and eastern hemlock.

This map unit is unsuited to recreational uses that require structures and onsite sewage disposal. The slope, numerous areas of Rock outcrop, and the depth to bedrock are the main management concerns. Because of its great natural beauty, this map unit is used mainly for hiking and camping. Many areas have scenic vistas and are used for overlooks.

This map unit is unsuited to pasture, hay, building site development, or crops. The slope, the depth to bedrock, and numerous areas of Rock outcrop are the main management concerns.

This map unit is poorly suited to access roads

because of the slope, the depth to bedrock, numerous areas of Rock outcrop, and the severe hazard of erosion. Building and maintaining roads are very difficult and costly. Drilling and blasting of the hard bedrock are needed. Building the roadbed on the natural soil, where possible, minimizes slumping. Hydroseeding is a good way to revegetate steep, bare areas.

The capability subclass is VIIIs in areas of Rock outcrop and VIIe in areas of the Cleveland soil. The Rock outcrop has not been assigned a woodland ordination symbol. Based on chestnut oak as the indicator species, the woodland ordination symbol is 2R in areas of the Cleveland soil.

RoA—Rosman fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This map unit consists mainly of nearly level, very deep, well drained or moderately well drained Rosman and similar soils in slightly elevated areas on flood plains. The unit is commonly along major streams or in areas adjacent to the natural levees of Biltmore soils along the inside of the curve at the bends of streams. Individual areas are oblong and range from 1 to 30 acres in size.

The typical sequence, depth, and composition of the layers in the Rosman soil are as follows—

Surface layer:
0 to 13 inches, dark brown fine sandy loam

Underlying material:
13 to 24 inches, reddish brown and dark brown fine sandy loam
24 to 65 inches, brown fine sandy loam
65 to 73 inches, very dark grayish brown very fine sandy loam

Permeability is moderately rapid. Surface runoff is slow. The soil is occasionally flooded for very brief periods. The seasonal high water table is 2.5 to 5.0 feet below the surface.

Included in mapping are small areas of Biltmore, Cullowhee, Reddies, Statler, and Nikwasi soils. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained or very poorly drained. They are in depressions where small streams cross the unit. Cullowhee, Nikwasi, and Reddies soils are moderately deep to strata of gravel, cobbles, or sand. Biltmore soils are sandy and are on slightly elevated natural stream levees. Statler soils are on low stream terraces and are rarely flooded. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Rosman soil but have a lighter colored surface layer.

Much of the acreage in this map unit is used for row crops. Some areas are used for specialty crops, pasture, hay, or recreational purposes.

This map unit is well suited to row crops. The flooding is the main hazard. Poor air drainage in this map unit is also a management concern affecting frost-sensitive row crops. The most common crops are silage corn, sweet corn, tomatoes, strawberries, cabbage, broccoli, and burley tobacco (fig. 15). Split applications of fertilizer are needed because nutrients are easily leached. Land shaping helps to open outlets and drain surface water from depressions. Vegetative filter strips can improve water quality and provide wildlife habitat. Irrigation is needed during dry periods in the growing season and to protect sensitive crops, such as strawberries and tomatoes, from frost. Herbicides may be adversely affected by the organic matter content in the surface layer.

This map unit is well suited to specialty crops, such as landscaping plants and Christmas trees. The flooding is the main hazard. The soil is desirable for growing and harvesting bare-rooted seedlings, such as Fraser fir, because it has a loamy surface layer, is nearly level, and is near streams that supply additional water for irrigation. Digging, balling, and burlapping landscaping plants and Christmas trees are easy during harvesting. Irrigation is needed to overcome droughtiness, to cool the crop on hot days, and to saturate the soil before harvest. Land shaping helps to smooth the surface and improves the efficiency of irrigation water. Vegetative filter strips can improve water quality and provide wildlife habitat. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, and rhododendron. Fraser fir is grown for use as Christmas trees. Water management practices similar to those used in row crops are appropriate.

This map unit is well suited to pasture and hay. The flooding is the main hazard. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can help to minimize damage to streambanks.

This map unit is poorly suited to building site development. The flooding is the main hazard.

This map unit is well suited to commercial timber. It is not used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, pasture, or hayland. The most common trees are yellow-poplar, eastern white pine, northern red oak, white oak, scarlet oak, eastern hemlock, and red maple.

This map unit is poorly suited to recreational uses.

Figure 15.—Burley tobacco on Rosman fine sandy loam, 0 to 2 percent slopes, occasionally flooded.

The flooding is the main hazard. Because this soil is nearly level and is near streams, some areas are used for campsites, parks, picnic areas, and ball fields.

This map unit is poorly suited to access roads. The flooding is the main hazard. Elevating the roads during construction minimizes the damage caused by flooding.

The capability subclass is IIw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A.

SaB—Saunook gravelly loam, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Saunook and similar soils on benches and on toe slopes in coves in the low mountains. Individual areas are bowl shaped in the lower part and are long and narrow further up the drainageways. They range from 1 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Saunook soil are as follows—

Surface layer:

0 to 9 inches, dark brown gravelly loam

Subsoil:

9 to 24 inches, strong brown gravelly clay loam and gravelly sandy clay loam

24 to 44 inches, strong brown gravelly sandy loam and sandy loam

Underlying material:

44 to 60 inches, yellowish brown cobbly fine sandy loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and is medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in the concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Cullowhee, Dellwood, Whiteside, Nikwasi, and Reddies soils. Cullowhee, Dellwood, Nikwasi, and Reddies soils are subject to flooding. Cullowhee soils are somewhat poorly drained. Dellwood, Reddies, and Whiteside soils are moderately well drained. Nikwasi soils are poorly drained or very poorly drained. Also, Dellwood soils have more than 35 percent rock fragments in the subsoil. Whiteside soils are in depressions. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Saunook soil but have a redder subsoil and some areas of soils that are near the area of contact with the uplands and have 3 to 10 inches of recent overwash.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, recreational development, or building site development.

This map unit is well suited to pasture and hayland. Soil compaction, a moderate hazard of erosion, and damage to streambanks are the main management concerns. Grazing during wet periods causes compaction, reduces the rate of water infiltration, and increases the runoff rate. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings can help to control damage to streambanks. Maintaining sod in good condition helps to control erosion and improves water quality in nearby streams and lakes.

This map unit is well suited to crops. The slope, the moderate hazard of erosion, runoff from the higher adjacent areas, and poor air drainage are the main management concerns. The most common crops are silage corn, sweet corn, tomatoes, strawberries, and burley tobacco. Irrigation is used to protect high-value crops from frost or to supply additional water. Grassed field borders and grassed waterways help to control erosion and divert runoff. Vegetative filter strips can control erosion and improve water quality. The content of organic matter in the surface layer may affect some herbicides.

This map unit is well suited to specialty crops, such as landscaping plants, apples, Christmas trees, and ginseng. The slope, the moderate hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees.

This map unit is well suited to plants that are to be balled and burlapped during harvesting. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is well suited to building site development. Runoff from the higher adjacent areas and the moderate hazard of erosion are the main management concerns. Excavation for dwellings with basements is hampered by underground water from springs and seeps in some areas. A drainage system is needed in these areas. Building sites should be designed so that runoff is diverted. Sites that are wet because of seeps, springs, or runoff in concave areas should not be used for septic tank absorption fields. Establishing vegetation in bare areas helps to control erosion.

This map unit is well suited to commercial timber. Yellow-poplar is the most common tree. Other trees include black cherry, American beech, sweet birch, northern red oak, eastern white pine, white oak, scarlet oak, eastern hemlock, red maple, and yellow buckeye. Black walnut is also well suited to this soil. This soil is seldom managed for timber because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland.

This map unit is well suited to recreational uses. The slope and the moderate hazard of erosion are the main management concerns. Campsites, trailer parks, and hiking trails are common recreational uses. Springs and streams that provide drinking water are common in this map unit.

This map unit is well suited to access roads. Runoff from the higher adjacent areas and the moderate hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Sites should be designed so that runoff from the higher adjacent areas and water from springs and seeps are diverted from the roadbed. Establishing and maintaining vegetation in bare areas helps to control erosion.

The capability subclass is IIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A.

SaC—Saunook gravelly loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Saunook and similar soils on benches and on toe slopes in coves in the low

mountains. Individual areas are bowl shaped in the lower part and are long and narrow further up the drainageways. They range from 1 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Saunook soil are as follows—

Surface layer:
0 to 9 inches, dark brown gravelly loam

Subsoil:
9 to 24 inches, strong brown gravelly clay loam and gravelly sandy clay loam
24 to 44 inches, strong brown gravelly sandy loam and sandy loam

Underlying material:
44 to 60 inches, yellowish brown cobbly fine sandy loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Whiteside, Evard, and Cowee soils. Evard and Cowee soils are on the adjacent uplands. Also, Cowee soils are moderately deep to weathered bedrock. Whiteside soils are moderately well drained and are in depressions. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Saunook soil but have a redder subsoil and some areas of soils that are near the area of contact with the uplands and have 3 to 10 inches of recent overwash.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used for row crops, specialty crops, recreational development, or building site development.

This map unit is well suited to pasture and hayland. Soil compaction, the slope, a severe hazard of erosion, and damage to streambanks are the main management concerns. Grazing during wet periods causes compaction, reduces the rate of water infiltration, and increases the runoff rate. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings can help to control damage to streambanks. Maintaining sod in good condition helps to control erosion, conserves water, and improves water quality in nearby streams.

This map unit is moderately suited to crops. The slope, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. The most common crops are silage corn, sweet corn, tomatoes, strawberries, and burley tobacco. Grassed field borders and grassed waterways can help to control erosion and divert runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat. The content of organic matter in the surface layer may affect some herbicides.

This map unit is moderately suited to specialty crops, such as landscaping plants, Christmas trees, and ginseng. The slope, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees.

This map unit is well suited to plants that are to be balled and burlapped during harvesting. Establishing and maintaining sod in appropriate areas minimize erosion and help to control runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is moderately suited to building site development. The slope, runoff from the higher adjacent areas, and the severe hazard of erosion are the main management concerns. Excavation for dwellings with basements is hampered by underground water from springs and seeps in some areas. A drainage system is needed in these areas. Building sites should be designed so that runoff is diverted safely. Sites that are wet because of seeps, springs, or runoff in concave areas should not be used for septic tank absorption fields. Establishing vegetation in bare areas helps to control erosion.

This map unit is well suited to commercial timber. Yellow-poplar is the most common tree. Other trees include black cherry, American beech, sweet birch, northern red oak, eastern white pine, white oak, scarlet oak, eastern hemlock, red maple, and yellow buckeye. Black walnut is also well suited to this soil. This soil is seldom managed for timber because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland.

This map unit is moderately suited to recreational uses. The slope and the severe hazard of erosion are the main management concerns. Campsites and hiking trails are common recreational uses. Springs and streams that provide drinking water are common on this map unit.

This map unit is moderately suited to access roads. Runoff from the higher adjacent areas, the slope, and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use.

Sites should be designed so that runoff from the higher adjacent areas and water from springs and seeps are diverted from the roadbed. Establishing and maintaining vegetation in bare areas helps to control erosion.

The capability subclass is IVe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A.

SaD—Saunook gravelly loam, 15 to 30 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Saunook and similar soils on benches and on toe slopes in coves in the low mountains. Individual areas are bowl shaped in the lower part and are long and narrow further up the drainageways. They range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Saunook soil are as follows—

Surface layer:

0 to 9 inches, dark brown gravelly loam

Subsoil:

9 to 24 inches, strong brown gravelly clay loam and gravelly sandy clay loam

24 to 44 inches, strong brown gravelly sandy loam and sandy loam

Underlying material:

44 to 60 inches, yellowish brown cobbly fine sandy loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and is medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in the concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Whiteside, Evard, and Cowee soils. Evard and Cowee soils are on the adjacent uplands. Also, Cowee soils are moderately deep to weathered bedrock. Whiteside soils are moderately well drained and are in depressions. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Saunook soil but have a redder subsoil and some areas of soils that are near the area of contact with the uplands and have 3 to 10 inches of recent overwash.

Much of the acreage in this map unit is used as pasture or hayland. Some areas are used as woodland or for specialty crops, recreational development, or building site development.

This map unit is moderately suited to pasture and hayland. The slope, soil compaction, a severe hazard of erosion, and damage to streambanks are the main management concerns. Grazing during wet periods causes compaction, reduces the rate of water infiltration, and increases the runoff rate. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings can help to control damage to streambanks. Operating farm equipment is difficult on this map unit.

This map unit is moderately suited to commercial timber. The slope is the main limitation. Yellow-poplar is the most common tree. Other trees include black cherry, American beech, sweet birch, northern red oak, eastern white pine, white oak, scarlet oak, eastern hemlock, red maple, and yellow buckeye. Black walnut is also well suited to this soil. This soil is seldom managed for timber because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are very slick and highly erodible during wet periods because of the slope, the content of clay in the subsoil, and the content of organic matter in the surface layer.

This map unit is moderately suited to specialty crops, such as landscaping plants, Christmas trees, and ginseng. The slope, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees.

This map unit is moderately suited to plants that are to be balled and burlapped during harvesting. Establishing and maintaining sod in appropriate areas

minimize erosion and help to control runoff. Vegetative filter strips can control erosion and improve water quality. Mulch and plastic are used for some crops to conserve water and control erosion.

This map unit is poorly suited to building site development. The slope, runoff from the higher adjacent areas, and the severe hazard of erosion are the main management concerns. Excavation for dwellings with basements is hampered by underground water from springs and seeps in some areas. A drainage system is needed in these areas. Building sites should be designed so that runoff is diverted. Sites that are wet because of seeps, springs, or runoff in concave areas should not be used for septic tank absorption fields. Establishing vegetation in bare areas helps to control erosion. Hydroseeding is a good way to revegetate bare areas.

This map unit is poorly suited to recreational uses. The slope and the severe hazard of erosion are the main management concerns. Campsites and hiking trails, however, are common recreational uses. Springs and streams that provide drinking water are common in this map unit.

This map unit is poorly suited to access roads. Runoff from the higher adjacent areas, the slope, and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Sites should be designed so that runoff from the higher adjacent areas and water from springs and seeps are diverted from the roadbed. Establishing and maintaining vegetation in bare areas help to control erosion. Hydroseeding is a good way to revegetate bare areas.

The capability subclass is VIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

SbD—Saunook gravelly loam, 15 to 30 percent slopes, stony. This map unit consists mainly of moderately steep, very deep, well drained Saunook and similar soils on benches and on toe slopes in coves in the low mountains, especially below areas of rock outcrop. Individual areas are bowl shaped in the lower part and long and narrow further up the drainageways. They range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in the Saunook soil are as follows—

Surface layer:
0 to 9 inches, dark brown gravelly loam

Subsoil:
9 to 24 inches, strong brown gravelly clay loam and gravelly sandy clay loam
24 to 44 inches, strong brown gravelly sandy loam and sandy loam

Underlying material:
44 to 60 inches, yellowish brown cobbly fine sandy loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and is medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in the concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Whiteside, Evard, and Cowee soils. Evard and Cowee soils are on the adjacent uplands. Also, Cowee soils are moderately deep to weathered bedrock. Whiteside soils are moderately well drained and are in depressions. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Saunook soil but have a redder subsoil and some areas of soils that are near the area of contact with the uplands and have 3 to 10 inches of recent overwash.

Much of the acreage in this map unit is used as pasture and hayland. Some areas are used as woodland or for specialty crops, recreational development, or building site development.

This map unit is moderately suited to pasture and hayland. The slope, stones on the surface, soil compaction, a severe hazard of erosion, and damage to streambanks are the main management concerns. Grazing during wet periods causes compaction, reduces the rate of water infiltration, and increases the runoff rate. The stones on the surface are also management concerns during establishing pasture and mowing hay. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings can help to control damage to streambanks. Operating farm equipment is difficult on this map unit.

This map unit is moderately suited to commercial timber. The slope, stones on the surface, and the hazard of erosion are the main management concerns. Yellow-poplar is the most common tree. Other trees include black cherry, American beech, sweet birch, northern red oak, eastern white pine, white oak, scarlet oak, eastern hemlock, red maple, and yellow buckeye. Black walnut is also well suited to this soil. This soil is seldom managed for timber because of the small size of the mapped areas and the potentially higher profits from crops, building sites, pasture, or hayland.

Reforestation of hardwoods occurs dominantly through sprouting. Cutting all of the trees and large

shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is good and where hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are very slick and easily eroded during wet periods because of the content of clay in the subsoil and the content of organic matter in the surface layer.

This map unit is poorly suited to specialty crops, such as landscaping plants, apples, Christmas trees, and ginseng. The slope, stones on the surface, the severe hazard of erosion, and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are grown for use as Christmas trees.

This map unit is moderately suited to plants that are to be balled and burlapped during harvesting. Stones on the surface are the main management concern affecting such harvesting. Establishing and maintaining sod in appropriate areas minimize erosion and help to control runoff. Vegetative filter strips can help to control erosion, improve water quality, and provide wildlife habitat.

This map unit is poorly suited to building site development. The slope, runoff from the higher adjacent areas, and the severe hazard of erosion are the main management concerns. Excavation for dwellings with basements is hampered by underground water from springs and seeps in some areas. A drainage system is needed in these areas. Building sites should be designed so that runoff is diverted. Sites that are wet because of seeps, springs, or runoff in concave areas should not be used for septic tank absorption fields. Establishing vegetation in bare areas helps to control erosion. Hydroseeding is a good way to revegetate bare areas.

This map unit is poorly suited to recreational uses. The slope, stones on the surface, and the severe hazard of erosion are the main management concerns. Campsites and hiking trails are common recreational uses. Springs and streams that provide drinking water are common in this map unit.

This map unit is poorly suited to access roads. The slope, runoff from the higher adjacent areas, and the content of clay in the subsoil are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Sites should be designed so that runoff from the higher adjacent areas and water from springs and seeps are diverted from the roadbed. Establishing and maintaining vegetation in bare areas help to control erosion. Hydroseeding is a good way to revegetate bare areas.

The capability subclass is VIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

SoD—Soco-Stecoah complex, 15 to 30 percent slopes. This map unit occurs mainly as areas of a moderately deep Soco soil and a deep Stecoah soil. Both soils are well drained. The unit is on moderately steep, south- to west-facing ridgetops in the intermediate mountains. Individual areas are long and narrow and range from 5 to 50 acres in size. Typically, they are 45 to 55 percent Soco soil and 30 to 40 percent Stecoah soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Soco soil are as follows—

Surface layer:
0 to 4 inches, very dark grayish brown channery loam

Subsoil:
4 to 24 inches, strong brown and dark yellowish brown fine sandy loam
24 to 32 inches, yellowish brown channery fine sandy loam

Underlying material:
32 to 35 inches, brown, gray, and black channery fine sandy loam saprolite

Weathered bedrock:
35 to 60 inches, multicolored, weathered phyllite

The typical sequence, depth, and composition of the layers in the Stecoah soil are as follows—

Surface layer:
0 to 5 inches, very dark grayish brown channery fine sandy loam

Subsoil:
5 to 22 inches, dark brown and strong brown fine sandy loam
22 to 45 inches, strong brown channery fine sandy loam

Weathered bedrock:
45 to 60 inches, multicolored, weathered, interbedded metasandstone and phyllite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Soco soil and 40 to 60 inches in the Stecoah soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Cheoah soils. These soils have a thick, dark surface layer and are on north- to east-facing side slopes. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Soco and Stecoah soils but have more rocks on the surface or have a redder subsoil.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for pasture, hay, building site development, or recreational development.

This map unit is moderately suited to commercial timber. The main management concerns are the slope and a moderate hazard of erosion. The Soco soil also has a moderate windthrow hazard. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, yellow-poplar, shortleaf pine, hickory, black locust, and northern red oak.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Planting genetically improved eastern white pine results in better stands than the stands of naturally seeded eastern white pine. In cutover stands preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

This map unit is moderately suited to year-round logging. Proper erosion-control measures should be established to help control erosion during and after logging operations.

This map unit is poorly suited to building site development. The slope, the hazard of erosion, difficult access across the steep terrain, and the areas of the moderately deep Soco soil are management concerns. Revegetating disturbed areas is difficult because of the slope and freezing and thawing. Hydroseeding is a good way to revegetate bare areas. Excavation for dwellings with basements is hampered by the moderately deep Soco soil. Also, the Soco soil may be too shallow for septic tank absorption fields.

This map unit is moderately suited to recreational development. The slope and limited access are the main limitations. Some areas are used for hiking trails and scenic overlooks. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops. The slope, the severe hazard of erosion, and limited access are the main management concerns.

This map unit is moderately suited to pasture and hayland. The slope and limited access are the main limitations. Keeping the pasture and hayland in good condition helps to control erosion, conserves water, and improves water quality in surrounding streams and lakes.

This map unit is poorly suited to access roads. The slope, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope, freezing and thawing, and slumping. Hydroseeding is a good way to revegetate areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks increases the acidity of streams and kills aquatic life.

The capability subclass is VIe. Based on eastern white pine as the indicator species, the woodland ordination symbol is 11R in areas of the Soco soil and 12R in areas of the Stecoah soil.

SoE—Soco-Stecoah complex, 30 to 50 percent slopes. This map unit occurs mainly as areas of a moderately deep Soco soil and a deep Stecoah soil. Both soils are well drained. The unit is on steep, south- to west-facing ridgetops and side slopes in the

intermediate mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. Individual areas range from 5 to 50 acres in size. Typically, they are 40 to 50 percent Soco soil and 30 to 40 percent Stecoah soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Soco soil are as follows—

Surface layer:
0 to 4 inches, very dark grayish brown channery loam

Subsoil:
4 to 24 inches, strong brown and dark yellowish brown fine sandy loam
24 to 32 inches, yellowish brown channery fine sandy loam

Underlying material:
32 to 35 inches, brown, gray, and black channery fine sandy loam saprolite

Weathered bedrock:
35 to 60 inches, multicolored, weathered phyllite

The typical sequence, depth, and composition of the layers in the Stecoah soil are as follows—

Surface layer:
0 to 5 inches, very dark grayish brown channery fine sandy loam

Subsoil:
5 to 22 inches, dark brown and strong brown fine sandy loam
22 to 45 inches, strong brown channery fine sandy loam

Weathered bedrock:
45 to 60 inches, multicolored, weathered, interbedded metasandstone and phyllite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Soco soil and 40 to 60 inches in the Stecoah soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Cheoah, Santeetlah, and Spivey soils. These soils have a thick, dark surface layer. Cheoah soils are on north- to east-facing side slopes. The very deep Santeetlah and Spivey soils are in drainageways. Also, Spivey soils have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Soco and Stecoah soils but have more rocks on the surface or have a redder subsoil.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for building site development or recreational development.

This map unit is poorly suited to commercial timber. The slope and a severe hazard of erosion are the main management concerns. The Soco soil also has a moderate windthrow hazard. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, black locust, and northern red oak.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Planting genetically improved eastern white pine results in better stands than the stands of naturally seeded eastern white pine. In cutover stands preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and lowers planting costs. Plant competition should be controlled again a few years after planting.

This map unit is poorly suited to building site development. The slope, the severe hazard of erosion, difficult access across the steep terrain, and the areas of the moderately deep Soco soil are management concerns. Revegetating disturbed areas is difficult because of the slope and freezing and thawing. Hydroseeding is a good way to revegetate bare areas. Excavation for dwellings with basements is hampered by the moderate depth to weathered bedrock in areas of the Soco soil. Also, the Soco soil may be too shallow for septic tank absorption fields.

This map unit is poorly suited to recreational development. The slope is the main limitation. Some areas are used for hiking trails and scenic overlooks. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops, pasture, and hayland. The slope, the severe hazard of erosion, and limited access are the main management concerns.

This map unit is poorly suited to access roads. The slope, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope, freezing and

thawing, and slumping. Hydroseeding is a good way to revegetate areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

The capability subclass is VIIe. Based on eastern white pine as the indicator species, the woodland ordination symbol is 11R in areas of the Soco soil and 12R in areas of the Stecoah soil.

SoF—Soco-Stecoah complex, 50 to 95 percent slopes. This map unit occurs mainly as areas of a moderately deep Soco soil and a deep Stecoah soil. Both soils are well drained. The unit is on very steep, south- to west-facing side slopes in the intermediate mountains. Individual areas are irregular in shape and range from 5 to 50 acres in size. Typically, they are 40 to 50 percent Soco soil and 30 to 40 percent Stecoah soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Soco soil are as follows—

Surface layer:
0 to 4 inches, very dark grayish brown channery loam

Subsoil:
4 to 24 inches, strong brown and dark yellowish brown fine sandy loam
24 to 32 inches, yellowish brown channery fine sandy loam

Underlying material:
32 to 35 inches, brown, gray, and black channery fine sandy loam saprolite

Weathered bedrock:
35 to 60 inches, multicolored, weathered phyllite

The typical sequence, depth, and composition of the layers in the Stecoah soil are as follows—

Surface layer:
0 to 5 inches, very dark grayish brown channery fine sandy loam

Subsoil:
5 to 22 inches, dark brown and strong brown fine sandy loam
22 to 45 inches, strong brown channery fine sandy loam

Weathered bedrock:
45 to 60 inches, multicolored, weathered, interbedded metasandstone and phyllite

Permeability is moderately rapid in both soils. The depth to weathered bedrock is 20 to 40 inches in the Soco soil and 40 to 60 inches in the Stecoah soil. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed.

Included in mapping are small areas of Cheoah, Santeetlah, and Spivey soils. These soils have a thick, dark surface layer. Cheoah soils are on north- to east-facing side slopes. The very deep Santeetlah and Spivey soils are in drainageways. Also, Spivey soils have more than 35 percent rock fragments in the subsoil. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Soco and Stecoah soils but have more rocks on the surface or have a redder subsoil.

Nearly all of the acreage in this map unit is used as woodland. A few areas are used for recreational development.

This map unit is poorly suited to commercial timber. The main management concerns are the slope and a severe hazard of erosion. The Soco soil also has a moderate windthrow hazard. The most common trees are scarlet oak, chestnut oak, black oak, white oak, eastern white pine, pitch pine, Virginia pine, hickory, black locust, and northern red oak.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Planting genetically improved eastern white pine results in better stands than the stands of naturally seeded eastern white pine. In cutover stands preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating

wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to recreational uses. A few areas are used for hiking trails and scenic overlooks. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to row crops, pasture, hay, and building site development. The slope, the severe hazard of erosion, and limited access are the main management concerns.

This map unit is poorly suited to access roads. The slope, the instability of the underlying bedrock, and the severe hazard of erosion are the main management concerns. Revegetating areas that have been cut and filled is difficult because of the slope, freezing and thawing, and slumping. Hydroseeding is a good way to revegetate areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The underlying bedrock is very susceptible to landslides, especially during periods of intensive rainfall and heavy traffic. Road construction may also expose seams of rocks bearing a large amount of sulfur. Water seeping through or flowing over these rocks may increase the acidity of streams and kill aquatic life.

The capability subclass is VIIe. Based on eastern white pine as the indicator species, the woodland ordination symbol is 11R in areas of the Soco soil and 12R in areas of the Stecoah soil.

SrD—Spivey-Santeetlah complex, 15 to 30 percent slopes, stony. This map unit occurs mainly as areas of moderately steep, very deep, well drained Spivey and Santeetlah soils. The unit is on benches and on toe slopes and along drainageways in coves in the intermediate mountains. Typically, the Spivey soil is along the drainageways, and the Santeetlah soil is between the drainageways. Individual areas are bowl shaped in the lower part and long and narrow further up the drainageways. They range from 4 to 50 acres in size. Typically, they are 45 to 55 percent Spivey soil and 25 to 35 percent Santeetlah soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Spivey soil are as follows—

Surface layer:

0 to 13 inches, very dark brown and dark brown flaggy loam

Subsoil:

13 to 18 inches, dark yellowish brown very flaggy loam

18 to 60 inches, strong brown and yellowish brown very flaggy fine sandy loam

The typical sequence, depth, and composition of the layers in the Santeetlah soil are as follows—

Surface layer:

0 to 12 inches, very dark brown and dark brown flaggy loam

Subsoil:

12 to 28 inches, dark yellowish brown and strong brown loam

28 to 60 inches, dark yellowish brown channery fine sandy loam

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Soco, Stecoah, and Cheoah soils. Soco and Stecoah soils formed in saprolite on south- to west-facing slopes. These soils have a surface layer that is thinner or lighter colored than that of the Spivey and Santeetlah soils. Also, Soco soils are moderately deep to weathered bedrock. Cheoah soils formed in saprolite on north- to east-facing side slopes. Also included are small areas of moderately well drained or somewhat poorly drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Spivey and Santeetlah soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are in convex, south- to west-facing areas. Where the surface layer is more than 20 inches thick, the soils are in north- to east-facing areas.

Most of the acreage in this map unit is wooded. Some areas are used for pasture, hay, building site development, or recreational development.

This map unit is only moderately suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for management concerns, such as plant competition, the slope, a moderate hazard of erosion, and runoff from

the higher adjacent areas. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other common trees include black cherry, American beech, yellow birch, white oak, black oak, sweet birch, northern red oak, sugar maple, yellow buckeye, eastern hemlock, and eastern white pine. Black cherry, sweet birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine results in better stands than the stands of naturally seeded eastern white pine. It commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and where hardwood seedlings are not available. In cutover stands preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick and highly erodible during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is moderately suited to pasture and hayland. The slope, stones on the surface, a severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. The stones damage farm equipment used for establishing and maintaining pasture and mowing and baling hay, especially in areas of the Spivey soil. The Santeetlah soil has fewer stones on the surface and is better suited to pasture and hayland. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Properly locating watering facilities and stream crossings helps to prevent damage to streambanks.

This map unit is poorly suited to building site development. The slope, stones, runoff from the higher adjacent areas, and the severe hazard of erosion are management concerns. The Santeetlah soil is better suited to building site development than the Spivey soil because it has fewer rocks and seeps or springs are less common. Excavation for dwellings with basements is hampered by rocks and underground water from seeps and springs. A drainage system is needed in these areas. Building sites should be designed so that runoff from the higher adjacent areas is diverted safely. Sites that are wet because of seeps, springs, and runoff and, where practical, areas of the Spivey soil should not be used for septic tank absorption fields.

This map unit is poorly suited to most recreational uses. Some areas are used for hiking trails. The slope, stones, and the severe hazard of erosion are management concerns. The hiking trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, springs, seeps, and the severe hazard of erosion are management concerns. Because unsurfaced roads are soft and slick during wet periods, the roads should be surfaced and properly maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large rocks. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

The capability subclass is VIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

SrE—Spivey-Santeetlah complex, 30 to 50 percent slopes, stony. This map unit occurs mainly as areas of moderately steep, very deep, well drained Spivey and Santeetlah soils. The unit is on benches and on toe slopes and along drainageways in coves in the intermediate mountains. Typically, the Spivey soil is along the drainageways, and the Santeetlah soil is between the drainageways. Individual areas are bowl shaped in the lower part and long and narrow further up the drainageways. They range from 4 to 50 acres in size. Typically, they are 45 to 55 percent Spivey soil and 25 to 35 percent Santeetlah soil. The two soils occur as areas too intricately mixed and too small in size to be mapped separately.

The typical sequence, depth, and composition of the layers in the Spivey soil are as follows—

Surface layer:

0 to 13 inches, very dark brown and dark brown flaggy loam

Subsoil:

13 to 18 inches, dark yellowish brown very flaggy loam

18 to 60 inches, strong brown and yellowish brown very flaggy fine sandy loam

The typical sequence, depth, and composition of the layers in the Santeetlah soil are as follows—

Surface layer:

0 to 12 inches, very dark brown and dark brown flaggy loam

Subsoil:

12 to 28 inches, dark yellowish brown and strong brown loam

28 to 60 inches, dark yellowish brown channery fine sandy loam

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Soco, Stecoah, and Cheoah soils. Soco and Stecoah soils formed in saprolite on south- to west-facing slopes. These soils have a surface layer that is thinner or lighter colored than that of the Spivey and Santeetlah soils. Also, Soco soils are moderately deep to weathered bedrock. Cheoah soils formed in saprolite on north- to east-facing side slopes. Also included are small areas of moderately well drained or somewhat poorly drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Spivey and Santeetlah soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are in convex, south- to west-facing areas. Where the surface layer is more than 20 inches thick, the soils are in north- to east-facing areas.

Most of the acreage in this map unit is wooded. Some areas are used as pasture or for recreational development.

This map unit is only moderately suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for management concerns, such as the slope, plant competition, a moderate hazard of erosion, and runoff from the higher adjacent areas. Yellow-poplar is the most common tree at elevations below 4,000 feet. Other common trees include black cherry, American beech, sweet birch, yellow birch, white oak, black oak, northern red oak, sugar maple, yellow buckeye, eastern hemlock, and eastern white pine. Black cherry, sweet birch, northern red oak, and sugar maple are the most common trees at elevations above 4,000 feet.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Old fields and other idle areas naturally reseed to yellow-poplar, Virginia pine, pitch pine, eastern white pine, and black locust. Genetically improved eastern white pine results in better stands than the stands of naturally seeded eastern white pine. It commonly is planted in areas, such as old fields, where the potential for reforestation through sprouting is not good and where hardwood seedlings are not available. In cutover stands, preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick and highly erodible during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to pasture and is unsuited to hay. The slope, stones on the surface, a severe hazard of erosion, and runoff from the higher adjacent areas are management concerns. Operating equipment is dangerous on this map unit.

This map unit is poorly suited to building site development. The slope, stones, runoff from the higher adjacent areas, and the severe hazard of erosion are management concerns. The Santeetlah soil is better suited to building site development than the Spivey soil because it has fewer rocks and seeps or springs are less common. Excavation for dwellings with basements is hampered by large rocks and underground water from seeps and springs. A drainage system is needed in these areas. Building sites should be designed so that runoff from the higher adjacent areas is diverted safely. Sites that are wet because of seeps, springs, and runoff, and, where practical, areas of the Spivey soil should not be used for septic tank absorption fields.

This map unit is poorly suited to recreational uses. Some areas are used for hiking trails. The slope, stones, and the severe hazard of erosion are management concerns. The hiking trails are very slick during wet periods because of the slope and the

content of organic matter in the surface layer.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, springs, seeps, and the severe hazard of erosion are management concerns. Because unsurfaced roads are soft and slick during wet periods, the roads should be surfaced and properly maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

The capability subclass is VIIs. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

SvB—Statler loam, 1 to 5 percent slopes, rarely flooded. This map unit consists mainly of nearly level and gently sloping, very deep, well drained Statler and similar soils on low stream terraces. Individual areas are long bands adjacent to flood plains. They range from 1 to 20 acres in size.

The typical sequence, depth, and composition of the layers in the Statler soil are as follows—

Surface layer:
0 to 9 inches, dark brown loam

Subsoil:
9 to 30 inches, yellowish brown clay loam
30 to 62 inches, yellowish brown sandy clay loam that has yellowish red and light yellowish brown mottles
62 to 70 inches, strong brown fine sandy loam that has yellowish red and yellowish brown mottles

Underlying material:
70 to 85 inches, multicolored alluvium that has a fine sandy loam texture

Permeability is moderate. Surface runoff is slow or medium. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Dillard, Hemphill, Reddies, and Rosman soils. Dillard soils are moderately well drained and have moderate permeability. Hemphill soils are very poorly drained and have slow permeability. Dillard and Hemphill soils are in depressions. Reddies soils are moderately deep to strata of gravel, cobbles, and sand. Reddies and Rosman soils have less clay in the subsoil than the Statler soil. They are on flood plains that are occasionally flooded. Included soils make up about 15 percent of this map unit.

Also included in mapping are small areas of soils that are similar to the Statler soil but have more rocks on the surface, soils that have a dark surface layer that is thicker than that of the Statler soil, or soils that have a seasonal high water table 3 to 6 feet below the surface.

Much of the acreage in this map unit is used for row crops. Some areas are used for specialty crops, pasture, hay, or building site development.

This map unit is well suited to cropland. The flooding, runoff from the higher adjacent areas, and poor air drainage are management concerns. The organic matter content in the surface layer may affect herbicides. The most common crops are silage corn, tomatoes, strawberries, cabbage, broccoli, and burley tobacco.

Land shaping helps to open outlets and drain surface water from depressions. Grassed field borders and diversions can be used to safely remove runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife cover. Mulch is commonly used on some crops to hold moisture, control weeds, and help to control erosion. Irrigation is also used to protect high-value crops, such as strawberries, from frost and to supply additional water.

This map unit is well suited to specialty crops, such as landscaping plants and Christmas trees. The flooding and runoff from the higher adjacent areas are the main management concerns. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are commonly grown for use as Christmas trees. This soil is well suited to trees and other plants that must be dug during harvesting. Water management practices similar to those used in row crops are appropriate.

This map unit is well suited to pasture and hayland. The flooding, soil compaction, and damage to streambanks are the main management concerns. Land shaping before establishing pasture and hay helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities, fences, and stream crossings can help to prevent damage to streambanks.

This map unit is poorly suited to building site development. The flooding and runoff from adjacent land are management concerns.

This map unit is well suited to commercial timber. It is generally not used for commercial timber, however, because of the small size of the mapped areas and the potentially higher profits from crops, building site development, pasture, or hayland. The most common trees are yellow-poplar, eastern white pine, white oak,

red maple, and eastern hemlock.

This map unit is moderately suited to recreational uses, such as parks, picnic areas, and tennis courts. The flooding is the main hazard.

This map unit is poorly suited to access roads. The flooding and runoff from the higher adjacent areas are the main management concerns. Elevating the roadbeds during construction minimizes the damage caused by flooding. The roads should be designed so that runoff from the higher adjacent areas is properly diverted. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use.

The capability subclass is IIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A.

SyA—Sylva-Whiteside complex, 0 to 2 percent slopes. This nearly level map unit occurs mainly as areas of a very deep, poorly drained Sylva soil and a moderately well drained Whiteside soil. The unit is on colluvial flats in coves in the intermediate mountains, primarily in the southern part of the county. Generally, the Sylva soil is in depressions, and the Whiteside soil is in slightly elevated areas. Also, the thick growth of native plants in most areas limits observations of the soils. Individual areas are bowl shaped in the lower part and narrow further up the drainageways. They range from 5 to 40 acres in size. Typically, they are 50 to 60 percent Sylva soil and 20 to 30 percent Whiteside soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Sylva soil are as follows—

Surface layer:
0 to 8 inches, black and very dark grayish brown loam

Subsoil:
8 to 37 inches, light gray loam and sandy loam

Underlying material:
37 to 65 inches, light brownish gray loam

The typical sequence, depth, and composition of the layers in the Whiteside soil are as follows—

Surface layer:
0 to 14 inches, very dark grayish brown fine sandy loam

Subsoil:
14 to 24 inches, yellowish brown sandy clay loam that has streaks of very dark grayish brown in old root channels
24 to 30 inches, yellowish brown sandy clay loam that has strong brown and gray mottles
30 to 47 inches, gray fine sandy loam that has yellowish brown and gray mottles

Underlying material:
47 to 53 inches, light brownish gray sandy loam that has brownish yellow mottles
53 to 70 inches, gray sandy clay loam that has yellowish brown mottles

Permeability is moderately rapid in the Sylva soil and moderate in the Whiteside soil. The depth to bedrock is more than 60 inches. Surface runoff is very slow in the Sylva soil and slow in the Whiteside soil. The seasonal high water table is from the surface to 1 foot below the surface in areas of the Sylva soil and from 1.5 to 3.0 feet below the surface in areas of the Whiteside soil.

Included in mapping are small areas of Dellwood, Nikwasi, and Tuckasegee soils. Dellwood and Nikwasi soils are subject to flooding. Also, Dellwood soils are moderately well drained and are shallow to strata of gravel, cobbles, and sand. Nikwasi soils are moderately deep to strata of gravel, cobbles, and sand. Tuckasegee soils are well drained. They are in the highest areas of this map unit. Also included in mapping are areas of soils that are somewhat poorly drained or have more rocks in the subsoil than is typical for the Sylva and Whiteside soils. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Sylva and Whiteside soils but have more rocks, mainly of gravel size, in the surface layer or have a dark surface layer that is less than 7 inches thick.

Nearly all of the acreage in this map unit is wooded. Small areas are used for pasture, hay, building site development, or recreational purposes.

The Sylva soil is poorly suited to commercial timber. The Whiteside soil is well suited. The unit is used for commercial timber, however, because the two soils occur as areas too intricately mixed to be managed separately. The wetness and severe plant competition are the main management concerns in areas of the Sylva soil.

Eastern white pine and yellow-poplar are the most common trees. Other trees include eastern hemlock, sweet birch, red maple, white oak, black cherry, yellow birch, black locust, sugar maple, and basswood. Alder and red maple dominate sites that have been cleared and are reverting to woodland.

Hardwoods should be preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands the dense understory of rhododendron is very difficult to control and may form a canopy. Cutting all of

the trees and large shrubs in cutover areas increases the number and quality of the sprouts. Eastern white pine is preferred where it has been successfully established in old fields. Planting genetically improved eastern white pine in old fields results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and the hazard of wildfires and lowers planting costs.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soils are wet, skid trails and unsurfaced roads are very slick because of the wetness and the content of organic matter in the surface layer.

This map unit is moderately suited to pasture and hayland in drained areas. The wetness, the ponding, soil compaction, runoff from the higher adjacent areas, and damage to streambanks are management concerns. A tile drainage system is difficult and costly to install because of the nearly level slope and poor outlets. Grazing during wet periods causes severe compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Properly locating watering facilities and stream crossings can help to prevent damage to streambanks.

This map unit is poorly suited to building site development. The wetness and the ponding are the main management concerns.

This map unit is poorly suited to recreational uses because of the wetness and the ponding.

This map unit is poorly suited to access roads. The wetness and the ponding are the main management concerns. Elevating the roads during construction minimizes the damage caused by wetness and ponding.

The capability subclass is IIIw in areas of the Sylva soil and IIw in areas of the Whiteside soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8W in areas of the Sylva soil and 7A in areas of the Whiteside soil.

TaC—Tanasee-Balsam complex, 8 to 15 percent slopes, stony. This map unit occurs mainly as areas of strongly sloping, very deep, well drained Tanasee and Balsam soils in coves and gaps in the high mountains. Typically, the Tanasee soil is between drainageways in coves and gaps and the Balsam soil is along the drainageways. Areas in coves are bowl shaped in the lower part and narrow further up the drainageways. Areas in gaps are irregular in shape. Individual areas range from 4 to 30 acres in size. Typically, they are 45 to 55 percent Tanasee soil and 25 to 35 percent Balsam soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Tanasee soil are as follows—

Surface layer:
0 to 13 inches, black and very dark brown sandy loam

Subsoil:
13 to 31 inches, yellowish brown sandy loam

Underlying material:
31 to 51 inches, dark yellowish brown cobbly loamy coarse sand
51 to 65 inches, multicolored gravelly loamy sand

The typical sequence, depth, and composition of the layers in the Balsam soil are as follows—

Surface layer:
0 to 13 inches, black and very dark brown sandy loam

Subsoil:
13 to 48 inches, dark yellowish brown very cobbly loam and very cobbly sandy loam

Underlying material:
48 to 65 inches, dark yellowish brown, black, and white very cobbly sandy loam

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and is medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed in saprolite on the adjacent uplands. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Also included are small areas of somewhat poorly drained or moderately well drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Tanasee and Balsam soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils are on north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational purposes.

This map unit is moderately suited to commercial timber. The main management concerns are the cold

climate, limited access, and runoff from the higher adjacent areas. The most common trees are northern red oak, black cherry, American beech, sweet birch, sugar maple, yellow buckeye, black oak, yellow birch, and eastern hemlock at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the amount and quality of the desirable sprouts and also helps to control plant competition on these stands. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick and highly erodible during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is moderately suited to recreational uses. Limited access, the slope, and rocks on the surface, especially in areas of the Balsam soil, are the main management concerns. Campsites and hiking trails, however, are common. Springs and streams that provide drinking water are convenient to most campsites. Freezing and thawing and the severe hazard of erosion increase the need for the trails to be properly maintained.

This map unit is poorly suited to access roads. Stoniness, runoff from the higher adjacent areas, the springs, the seeps, freezing and thawing, and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced and continuously maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

The capability subclass is IVe in areas of the Tanasee soil and VIIs in areas of the Balsam soil. Based on red spruce as the indicator species, the woodland ordination symbol is 10A.

TaD—Tanasee-Balsam complex, 15 to 30 percent slopes, stony. This map unit occurs mainly as areas of moderately steep, very deep, well drained Tanasee and Balsam soils in coves and gaps in the high mountains. Typically, the Tanasee soil is between drainageways in coves and gaps and the Balsam soil is along the drainageways. Areas in coves are bowl shaped in the lower part and narrow further up the drainageways. Areas in gaps are irregular in shape. Individual areas range from 4 to 30 acres in size. Typically, they are 45 to 55 percent Tanasee soil and 25 to 35 percent Balsam soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Tanasee soil are as follows—

Surface layer:
0 to 13 inches, black and very dark brown sandy loam

Subsoil:
13 to 31 inches, yellowish brown sandy loam

Underlying material:
31 to 51 inches, dark yellowish brown cobbly loamy coarse sand
51 to 65 inches, multicolored gravelly loamy sand

The typical sequence, depth, and composition of the layers in the Balsam soil are as follows—

Surface layer:
0 to 13 inches, black and very dark brown sandy loam

Subsoil:
13 to 48 inches, dark yellowish brown very cobbly loam and very cobbly sandy loam

Underlying material:
48 to 65 inches, dark yellowish brown, black, and white very cobbly sandy loam

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Burton,

Craggey, and Wayah soils. These soils formed in saprolite on the adjacent uplands. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Also included are small areas of somewhat poorly drained or moderately well drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Tanasee and Balsam soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils are on north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational purposes.

This map unit is moderately suited to commercial timber. The main management concerns are the cold climate, limited access, the slope, and runoff from the higher adjacent areas. The most common trees are northern red oak, black cherry, American beech, sweet birch, sugar maple, yellow buckeye, black oak, yellow birch, and eastern hemlock at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the amount and quality of the desirable sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick and highly erodible during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to recreational uses. The slope and limited access are the main management concerns. Campsites and hiking trails, however, are common. Springs and streams that provide drinking water are convenient to most campsites. The severe hazard of erosion and freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, the springs, the seeps, freezing and thawing, and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced and continuously maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

The capability subclass is VIe in areas of the Tanasee soil and VIIs in areas of the Balsam soil. Based on red spruce as the indicator species, the woodland ordination symbol is 10R.

TaE—Tanasee-Balsam complex, 30 to 50 percent slopes, stony. This map unit occurs mainly as areas of steep, very deep, well drained Tanasee and Balsam soils in coves and gaps in the high mountains. Typically, the Tanasee soil is between drainageways in coves and gaps and the Balsam soil is along the drainageways. Areas in coves are bowl shaped in the lower part and narrow further up the drainageways. Areas in gaps are irregular in shape. Individual areas range from 4 to 30 acres in size. Typically, they are 45 to 55 percent Tanasee soil and 25 to 35 percent Balsam soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Tanasee soil are as follows—

Surface layer:
0 to 13 inches, black and very dark brown sandy loam

Subsoil:
13 to 31 inches, yellowish brown sandy loam

Underlying material:
31 to 51 inches, dark yellowish brown cobbly loamy coarse sand
51 to 65 inches, multicolored gravelly loamy sand

The typical sequence, depth, and composition of the layers in the Balsam soil are as follows—

Surface layer:
0 to 13 inches, black and very dark brown sandy loam

Subsoil:
13 to 48 inches, dark yellowish brown very cobbly loam and very cobbly sandy loam

Underlying material:
48 to 65 inches, dark yellowish brown, black, and white very cobbly sandy loam

Permeability is moderately rapid in both soils. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium or rapid where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. The seasonal high water table is more than 6 feet below the surface.

Included in mapping are small areas of Burton, Craggey, and Wayah soils. These soils formed in saprolite on the adjacent uplands. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Also included are small areas of somewhat poorly drained or moderately well drained soils around seeps and springs. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Tanasee and Balsam soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on the convex, south- to west-facing slopes. Where the surface layer is more than 20 inches thick, the soils are on north- to east-facing slopes.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational purposes.

This map unit is poorly suited to commercial timber. The main management concerns are the slope, the severe hazard of erosion, the cold climate, limited access, and runoff from the higher adjacent areas. The most common trees are northern red oak, black cherry, American beech, sweet birch, sugar maple, yellow buckeye, black oak, yellow birch, and eastern hemlock at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the amount and quality of the desirable sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. Skid trails and unsurfaced roads are slick and highly erodible during wet periods because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to recreational uses. The slope, stones, and limited access are the main management concerns. Hiking trails, however, are common. Springs and streams that provide drinking water are convenient to most of the trails. Freezing and thawing and the severe hazard of erosion increase the need for the trails to be properly maintained.

This map unit is poorly suited to access roads. The slope, stones, runoff from the higher adjacent areas, the springs, the seeps, freezing and thawing, and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced and continuously maintained for year-round use. Gravel continuously sinks into the subsoil. Building the roads near the area of contact with the uplands, where possible, helps to avoid the springs, the seeps, and the large stones. The roads should be designed so that runoff from the higher adjacent areas and water from seeps and springs are properly diverted.

The capability subclass is VIIe in areas of the Tanasee soil and VIIs in areas of the Balsam soil. Based on red spruce as the indicator species, the woodland ordination symbol is 10R.

TrE—Trimont gravelly loam, 30 to 50 percent slopes, stony. This map unit consists mainly of steep, very deep, well drained Trimont and similar soils in the low mountains on north- to east-facing head slopes or on south- to west-facing side slopes shaded by the higher mountains. Individual areas are irregular in shape and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers in the Trimont soil are as follows—

Surface layer:
0 to 10 inches, dark brown gravelly loam

Subsoil:
10 to 17 inches, reddish brown loam
17 to 40 inches, yellowish red clay loam
40 to 65 inches, yellowish red loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Cowee, Evard, Plott, and Saunook soils. Cowee and Evard soils are on south- to west-facing slopes. They have a surface layer that is thinner or lighter in color than that of the Trimont soil. Also, Cowee soils are moderately deep to weathered bedrock. Plott soils are in the intermediate mountains and have less clay in the subsoil than the Trimont soil. They have a dark surface layer that is thicker than that of the Trimont soil. Saunook soils are along drainageways. Also included near the ridgetop in some areas are small areas of rock outcrop. Areas of seepage commonly are associated with the areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Trimont soil but have a dark surface layer that is more than 10 inches thick or have more rocks on the surface.

Nearly all of the acreage in this map unit is wooded. A few areas are used for building site development, pasture, or specialty crops.

This map unit is poorly suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for some of the main management concerns, such as the slope and a severe hazard of erosion. Yellow-poplar is the most common tree. Other common trees include black cherry, American beech, sweet birch, white oak, black oak, and northern red oak.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine is commonly planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope, the content of organic matter in the surface layer, and the content of clay in the subsoil.

This map unit is poorly suited to building site development. The slope, limited access in winter, and the severe hazard of erosion are the main management concerns. Revegetating disturbed areas is difficult because of the slope. Hydroseeding is a good way to revegetate steep, bare areas.

This map unit is poorly suited to pasture and is unsuited to hayland because of the slope and the severe hazard of erosion in bare areas. Operating farm equipment is dangerous on this map unit. Most farming operations are done by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is poorly suited to specialty crops. The slope and the severe hazard of erosion are the main management concerns. In some areas, however, the unit has high productivity and is used for Christmas trees. Operating farm equipment is dangerous on this map unit. Most farming operations are done by hand. Establishing and maintaining sod in appropriate areas minimize erosion, conserve water, and help to control runoff. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is unsuited to row crops, hay, and recreational uses. The slope and the severe hazard of erosion are the main management concerns.

This map unit is poorly suited to access roads. The slope and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are slick when wet, they should be surfaced for year-round use. Revegetating large areas that have been cut and filled is difficult because of the slope. Hydroseeding is a good way to revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

TrF—Trimont gravelly loam, 50 to 95 percent slopes, stony. This map unit consists mainly of very steep, very deep, well drained Trimont and similar soils in the low mountains on north- to east-facing head slopes or side slopes shaded by the higher mountains.

Individual areas are irregular in shape and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers in the Trimont soil are as follows—

Surface layer:
0 to 10 inches, dark brown gravelly loam

Subsoil:
10 to 17 inches, reddish brown loam
17 to 40 inches, yellowish red clay loam
40 to 65 inches, yellowish red loam

Permeability is moderate. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The soil is frozen for long periods in the winter and warms up later in the spring than other soils at the same elevation.

Included in mapping are small areas of Cowee, Evard, Plott, and Saunook soils. Cowee and Evard soils are on south- to west-facing slopes. They have a surface layer that is thinner or lighter in color than that of the Trimont soil. Also, Cowee soils are moderately deep to weathered bedrock. Plott soils are in the intermediate mountains and have less clay in the subsoil than the Trimont soil. They have a dark surface layer that is thicker than that of the Trimont soil. Saunook soils are in drainageways. Also included in some areas are small areas of rock outcrop. Areas of seepage commonly are associated with the areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Trimont soil but have a dark surface layer that is more than 10 inches thick or have more rocks on the surface.

Nearly all of the acreage in this map unit is wooded. A few areas are used as pasture.

This map unit is poorly suited to commercial timber. The unit is desirable for timber production, however, because of the high productivity of commercial species, which helps to compensate for some of the main management concerns, such as the slope and a severe hazard of erosion. Yellow-poplar is the most common tree. Other common trees include black cherry, American beech, sweet birch, white oak, black oak, and northern red oak.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine is commonly planted in old fields and in other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate, controls plant competition, minimizes the amount of debris and the hazard of wildfires, and lowers planting costs. Plant competition should be controlled again a few years after planting.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to pasture. The slope and the severe hazard of erosion are the main management concerns. Operating farm equipment is dangerous on this map unit. Most farming operations are done by hand. Erosion is a hazard in areas where plants are becoming established and in sparsely vegetated or overgrazed areas. Keeping the pasture in good condition helps to control erosion and conserves water.

This map unit is unsuited to building site development, hay, crops, and recreational uses. The slope, the severe hazard of erosion, and limited access in the winter are the main management concerns.

This map unit is poorly suited to access roads. The slope and the severe hazard of erosion are the main management concerns. Because unsurfaced roads are slick when wet, they should be surfaced for year-round use. Revegetating large areas that have been cut and filled is difficult because of the slope. Hydroseeding is a good way to revegetate steep, bare areas. Building roadbeds on the natural soil, where possible, minimizes slumping.

The capability subclass is VIIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8R.

TwC—Tuckasegee-Whiteside complex, 8 to 15 percent slopes. This map unit occurs mainly as areas of a strongly sloping, very deep, well drained Tuckasegee soil and a moderately well drained Whiteside soil. The unit is on toe slopes and on benches and along drainageways in coves in the intermediate mountains, primarily in the southern part of the county. Typically, the Tuckasegee soil is between drainageways and the Whiteside soil is along the drainageways. Individual areas are bowl shaped in the

lower part and narrow further up the drainageways. They range from 2 to 30 acres in size. Typically, they are 35 to 45 percent Tuckasegee soil and 35 to 45 percent Whiteside soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Tuckasegee soil are as follows—

Surface layer:
0 to 11 inches, very dark brown gravelly loam

Subsoil:
11 to 24 inches, dark yellowish brown loam and gravelly loam
24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

The typical sequence, depth, and composition of the layers in the Whiteside soil are as follows—

Surface layer:
0 to 14 inches, very dark grayish brown fine sandy loam

Subsoil:
14 to 24 inches, yellowish brown sandy clay loam that has streaks of very dark grayish brown in old root channels
24 to 30 inches, yellowish brown sandy clay loam that has strong brown and gray mottles
30 to 47 inches, gray fine sandy loam that has yellowish brown and gray mottles

Underlying material:
47 to 53 inches, light brownish gray sandy loam that has brownish yellow mottles
53 to 70 inches, gray sandy clay loam that has yellowish brown mottles

Permeability is moderately rapid in the Tuckasegee soil and moderate in the Whiteside soil. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas. Water may pond in concave areas during periods of intensive rainfall. The seasonal high water table is more than 6 feet below the surface in areas of the Tuckasegee soil and from 1.5 to 3.0 feet below the surface in areas of the Whiteside soil.

Included in mapping are areas of Dellwood, Nikwasi, and Sylva soils. Dellwood and Nikwasi soils are subject to flooding. Sylva soils are poorly drained. Nikwasi soils are poorly drained or very poorly drained. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Tuckasegee and Whiteside soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are in convex areas. Where the surface layer is more than 20 inches thick, the soils are in concave areas.

About half of the acreage in this map unit is cleared of trees and used for high-value row crops, pasture, hay, or specialty crops. Other areas are used as woodland or for building site development or recreational purposes.

This map unit is moderately suited to high-value row crops, such as cabbage and broccoli. The slope, the severe hazard of erosion, and runoff from the surrounding uplands are the main management concerns. Grassed waterways, diversions, and field borders are needed to control runoff and erosion. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is well suited to pasture and hayland. The slope, soil compaction, and runoff from the higher surrounding uplands are the main management concerns. Land shaping before establishing pasture and hay helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration. Keeping the pasture and hayland in good condition helps to control erosion and conserves water.

This map unit is moderately suited to specialty crops, such as landscaping plants, Christmas trees, and ginseng. The slope and runoff from the higher surrounding uplands are the main management concerns. Also, a perched water table may interfere with the growth of Fraser fir in areas of the Whiteside soil. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are commonly grown for use as Christmas trees. This map unit is moderately suited to trees and other plants that must be dug during harvesting. Water management practices similar to those used in row crops are appropriate. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat. Establishing and maintaining sod in appropriate areas minimize erosion and help to control runoff.

This map unit is well suited to commercial timber. Plant competition, the slope, and runoff from the higher adjacent areas are the main management concerns. Yellow-poplar is the most common tree. Other common trees include black cherry, American beech, sweet birch, northern red oak, sugar maple, yellow buckeye,

yellow birch, white oak, red maple, black locust, eastern hemlock, and eastern white pine.

Hardwoods generally are preferred in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine commonly is planted in old fields and other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When these soils are wet, skid trails and unsurfaced roads are erodible and very slick because of the content of organic matter in the surface layer and runoff from the higher surrounding uplands.

The Tuckasegee soil is moderately suited to building site development. The slope and runoff from the surrounding uplands are the main management concerns. The Whiteside soil is poorly suited to building site development. The wetness, the slope, and runoff from the surrounding uplands are the main management concerns. If possible, areas of the Whiteside soil should not be used for septic tank absorption fields. Excavations for basements may be hampered by the depth to the seasonal high water table in areas of the Whiteside soil. Buildings should be designed so that runoff from the surrounding uplands is diverted.

This map unit is moderately suited to recreational uses. It commonly is used for campsites and hiking trails. Water sources, such as springs, are common in areas of this unit. The slope, the wetness, and runoff from the adjacent uplands are the main management concerns.

This map unit is moderately suited to access roads because of the slope, frost action, and the wetness. Runoff from the higher adjacent areas, springs and seeps, and controlling erosion are also management concerns. Because unsurfaced roads are soft and slick when wet, they should be surfaced for year-round use. Gravel continuously sinks into the soil material. Frequent smoothing of the road surface is needed because ruts form easily. Building the roads near the area of contact with the uplands helps to avoid the springs and seeps. The roads should be designed so that runoff from the higher adjacent areas is diverted. The water from the seeps and springs should be intercepted and diverted away from the roadbeds. Seeding roadbanks and maintaining a good plant cover minimize sedimentation and improve water quality.

The capability subclass is IIIe in areas of the Tuckasegee soil and IVe in areas of the Whiteside soil. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8A in areas of the Tuckasegee soil and 7A in areas of the Whiteside soil.

Ud—Udorthents, loamy. This map unit consists of borrow areas, sanitary landfills, and highway interchanges and roadbeds. In these areas most of the natural soils have been altered by digging, grading, or filling.

Borrow areas consist of excavated areas where the soil material has been removed as a source of fill material. The cuts are 4 to more than 40 feet deep. The base slope in these cuts is level to steep. Most cuts have two or more nearly vertical side slopes. The exposed surface layer consists mainly of weathered bedrock or saprolite. Borrow areas commonly range from 3 to 10 acres in size.

Borrow areas commonly include small areas of intermittent ponds, loose fill material, and exposed bedrock.

Some borrow areas are temporarily seeded and vegetated. A few borrow areas are naturally seeded to wild grasses, weeds, and trees. Borrow areas commonly have poor physical properties for plant growth. The available water capacity, soil fertility, and organic matter content are low. Rooting depth generally is shallow. Areas that are reseeded have potential for use as wildlife habitat. Neglected areas are easily eroded and are a significant source of sediment in the surrounding streams and lakes.

Sanitary landfills consist of graded trenches that are backfilled with alternate layers of solid refuse and soil material. After a final cover of about 2 feet of soil is added, the areas range from nearly level to steep. Maintaining a plant cover is difficult and costly in most areas. Also, the potential for the production of methane gas and subsidence severely limits the use of these areas after landfill operations are completed.

Highway interchanges and roadbeds consist of areas where the natural soils have been altered by road building operations. Excavated areas that have been cut through mountains commonly range from 10 to 100 feet or more. The areas in valleys or around highway interchanges that have been filled commonly range from

10 to 100 feet or more deep. About 30 percent of these areas are covered with impervious road building material or exposed bedrock. Impervious material greatly influences the hydrology of the surrounding areas.

Most areas are seeded. They are, however, costly to maintain, especially on cuts in south- to west-facing areas that freeze and thaw in the spring and fall. Some areas, especially those in metasedimentary rock formations, are susceptible to landslides during periods of intensive and prolonged rainfall. Also, metasedimentary rock formations may have a large amount of sulfur, which can increase the acidity of streams when the rocks are exposed by road building activities.

Onsite investigation is needed before the use and management of specific areas are planned.

The capability subclass is VIIs. The unit has not been assigned a woodland ordination symbol.

UfB—Udorthents-Urban land complex, 0 to 5 percent slopes, rarely flooded. This nearly level and gently sloping map unit occurs mainly as areas of Udorthents and areas of Urban land. Udorthents consist of areas of loamy, earthy material filled over soils on flood plains. These areas are 2 to 10 feet thick. The areas on flood plains were filled to reduce the hazard of flooding and to increase their value as construction sites. Urban land consists of impervious areas covered by buildings, roads and streets, and parking lots. Individual areas are generally 2 to 50 acres in size. Typically, they are about 60 percent loamy fill material that varies considerably in texture and degree of compaction and about 30 percent Urban land. They are long and narrow and are along stream channels. The Udorthents and areas of Urban land occur as areas too intricately mixed to be mapped separately.

Included in mapping are areas that have slope of more than 5 percent, small areas of natural soils, and areas that have stones, fragments of asphalt, and wood by-products. These inclusions make up about 10 percent of this map unit.

Onsite investigation is needed before the use and management of this map unit are planned. Foundation problems are common in areas of this map unit. Bulk density tests are needed to determine the suitability of these areas for foundations. These areas are rarely flooded for very brief periods. Surface runoff from the impervious areas during periods of intensive rainfall increases the hazard of flooding downstream. The areas of earthy fill material generally are vegetated and used for lawns, playgrounds, ball fields, or open areas.

The capability subclass is VIIs in areas of the Udorthents and VIIIs in areas of Urban land. This map unit has not been assigned a woodland ordination symbol.

WaD—Wayah sandy loam, 15 to 30 percent slopes, stony. This map unit consists mainly of moderately steep, very deep, well drained Wayah and similar soils on ridgetops in the high mountains. Individual areas are long and narrow and range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Wayah soil are as follows—

Surface layer:
 0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:
 14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:
 40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles
 46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are in saddles.

Nearly all of the acreage in this map unit is wooded. A few areas are in grassy balds or heath balds. Some areas are used for recreational development. Nearly all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is moderately suited to commercial timber. The severe climate, limited access, and the slope are the main management concerns. The productivity is significantly reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, American beech, black oak, yellow buckeye, eastern hemlock, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

Restricting the use of heavy equipment to dry periods helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is moderately suited to recreational uses. The slope and a moderate hazard of erosion are management concerns. Many areas commonly are used for scenic overlooks and hiking trails. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to crops, pasture, hay, and building site development. The slope, limited access, the cold climate, surface stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope is the main limitation. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

WaE—Wayah sandy loam, 30 to 50 percent slopes, stony. This map unit consists mainly of steep, very deep, well drained Wayah and similar soils on side slopes and ridgetops in the high mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. Individual areas range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Wayah soil are as follows—

Surface layer:

0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:

14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:

40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and crystalline rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is

less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or are in gaps.

Nearly all of the acreage in this map unit is wooded. Some areas are used for recreational development. Most of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is poorly suited to commercial timber. The main management concerns are the slope, the severe climate, limited access, and a severe hazard of erosion. The productivity is significantly reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, American beech, black oak, yellow buckeye, eastern hemlock, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

Restricting the use of heavy equipment to dry periods helps to prevent soil compaction. When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick because of the slope and the content of organic matter in the surface layer.

This map unit is poorly suited to recreational uses. The slope and the severe hazard of erosion are the main management concerns. Some areas are used for scenic overlooks and hiking trails. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is poorly suited to crops, pasture, hay, and building site development. The slope, difficult access across the steep terrain, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, limited access, and the severe hazard of erosion are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

WaF—Wayah sandy loam, 50 to 95 percent slopes, stony. This map unit consists mainly of very steep, very deep, well drained Wayah and similar soils on side slopes in the high mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Wayah soil are as follows—

Surface layer:
- 0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:
- 14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:
- 40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles
- 46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey

soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational development. Almost all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is poorly suited to commercial timber. The slope, the severe climate, limited access, and a severe hazard of erosion are the main management concerns. The productivity is significantly reduced by the severe climate. The unit is commonly used for timber production, however, because of the desirable species, which help to compensate for some of the management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, American beech, black oak, yellow buckeye, eastern hemlock, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

Hardwoods are managed in stands that have the potential for reforestation through sprouting and where hardwood seedlings are available, especially at elevations below 5,300 feet. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Stands generally are managed for red spruce at elevations above 5,300 feet. Thinning red spruce increases the quality of the stand. Red spruce is shallow rooted, however, and should be thinned under the supervision of a professional forester. Stands are not managed for Fraser fir because most of the large trees are dying from infestations of the balsam woolly aphid and from various environmental factors.

The slope restricts the equipment used in management and harvesting. Generally, operating wheeled and tracked equipment is dangerous on this map unit. A cable yarding system is safer, controls erosion and results in less damage to the soil, and helps to maintain productivity.

This map unit is poorly suited to most recreational uses. A few areas are used for scenic overlooks and hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Freezing and thawing increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hay, or building site development. The slope, limited access, the cold climate, stones, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope, limited access, and the severe hazard of erosion are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 4R.

WeC—Wayah sandy loam, windswept, 8 to 15 percent slopes, stony. This map unit consists mainly of strongly sloping, very deep, well drained Wayah and similar soils on ridgetops in the high mountains. Individual areas are long and narrow and range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Wayah soil are as follows—

Surface layer:
0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:
14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:
40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The climate is severe. It is cold, icy, and very windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Nearly all of the acreage in this map unit is wooded. Some areas are used for recreational development. Nearly all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concerns are the high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. Limited access also is a management concern. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is moderately suited to recreational uses. The slope, stones on the surface, and limited access are the main management concerns. This unit is used for scenic overlooks, campsites, and hiking trails. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Frequent ice storms in winter and freezing and thawing in spring and fall increase the need for the trails to be properly maintained. Campsites that have a dependable source of water are scarce on this soil.

This map unit is unsuited to crops, pasture, hay, or building site development. The slope, difficult access across the steep terrain, and the harsh climate are management concerns.

This map unit is moderately suited to access roads. The slope and limited access are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The capability subclass is IVe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2A.

WeD—Wayah sandy loam, windswept, 15 to 30 percent slopes, stony. This map unit consists mainly of moderately steep, very deep, well drained Wayah and similar soils on ridgetops in the high mountains. Individual areas are long and narrow and range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Wayah soil are as follows—

Surface layer:

0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:

14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:

40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and very windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey

Figure 16.—A stand of poorly formed northern red oak in an area of Wayah sandy loam, windswept, 15 to 30 percent slopes, stony, on Rough Butt Bald.

soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Nearly all of the acreage in this map unit is wooded. Some areas are used for recreational development. Nearly all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concerns are the high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees (fig. 16). Limited access

and the slope are also management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is moderately suited to recreational uses. It is used for scenic overlooks, campsites, and hiking trails. The slope and stones on the surface are the main management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Frequent ice storms in winter and freezing and thawing in spring and fall increase the need for the trails to be properly maintained. Campsites that have a dependable source of water are scarce on this soil.

This map unit is unsuited to crops, pasture, hay, or building site development. The slope, difficult access across the steep terrain, and the harsh climate are management concerns.

This map unit is poorly suited to access roads. The slope and limited access are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate bare areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The capability subclass is VIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

WeE—Wayah sandy loam, windswept, 30 to 50 percent slopes, stony. This map unit consists mainly of steep, very deep, well drained Wayah and similar soils on side slopes and ridgetops in the high mountains. Areas on ridgetops are long and narrow, and areas on side slopes are irregular in shape. Individual areas range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Wayah soil are as follows—

Surface layer:
0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:
14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:
40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles
46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and very windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes or in saddles.

Nearly all of the acreage in this map unit is wooded. A few areas are used for recreational development. Nearly all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concerns are the high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, limited access, and the severe hazard of erosion are also management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to recreational uses. A

few areas are used for hiking trails and scenic overlooks. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Frequent ice storms in winter and freezing and thawing in spring and fall increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hay, and building site development. The slope, limited access, the harsh climate, stones on the surface, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The slope and limited access are the main management concerns. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

WeF—Wayah sandy loam, windswept, 50 to 95 percent slopes, stony. This map unit consists mainly of very steep, very deep, well drained Wayah and similar soils on side slopes in the high mountains. Individual areas are irregular in shape and range from 10 to 80 acres in size.

The typical sequence, depth, and composition of the layers in the Wayah soil are as follows—

Surface layer:

0 to 14 inches, black and very dark grayish brown sandy loam

Subsoil:

14 to 40 inches, dark yellowish brown gravelly sandy loam

Underlying material:

40 to 46 inches, pale brown gravelly sandy loam saprolite that has light gray and white mottles

46 to 65 inches, mottled yellowish brown, yellowish red, white, and pale brown gravelly sandy loam saprolite

Permeability is moderately rapid. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and rapid where the litter has been removed. The weather is cold, icy, and very windy in winter and rainy, foggy, and cool the rest of the year. The soil is frozen for long periods in the winter.

Included in mapping are small areas of Burton, Craggey, and Oconaluftee soils. Burton and Craggey soils are near areas of rock outcrop. Burton soils are moderately deep to hard bedrock, and Craggey soils are shallow to hard bedrock. Oconaluftee soils are similar in appearance to the Wayah soil but formed from metasedimentary rock and are near the geological break between metasedimentary rocks and high-grade metamorphic rocks. Also included are small areas of rock outcrop. Inclusions make up about 15 percent of the map unit.

Also included in mapping are soils that are similar to the Wayah soil but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are on spur ridges or shoulder slopes. Where the surface layer is more than 20 inches thick, the soils are on the lower side slopes.

Almost all of the acreage in this map unit is wooded. A few areas are used for recreational development. Nearly all of this map unit is in the Nantahala National Forest or along the Blue Ridge Parkway.

This map unit is unsuited to commercial timber. The main management concerns are the high wind velocity in winter and severe ice storms that stunt, twist, or otherwise damage the trees. The slope, limited access, and a severe hazard of erosion are also management concerns. The most common trees are northern red oak, black cherry, sugar maple, yellow birch, and sweet birch at elevations below 5,300 feet. A relict Fraser fir and red spruce forest is common in most areas at elevations above 5,300 feet. The acreage of red spruce and Fraser fir is decreasing. Researchers are intensively studying the soils, plant and animal life, and the environment in these areas.

This map unit is poorly suited to recreational uses. Some areas, however, are used for scenic overlooks and hiking trails. The slope and the severe hazard of erosion are management concerns. The trails are very slick during wet periods because of the slope and the content of organic matter in the surface layer. Frequent ice storms in winter and freezing and thawing in spring and fall increase the need for the trails to be properly maintained.

This map unit is unsuited to crops, pasture, hay, or building site development. The slope, limited access, the harsh climate, stones on the surface, and the severe hazard of erosion are management concerns.

This map unit is poorly suited to access roads. The

slope is the main limitation. Revegetating large areas that have been cut and filled is difficult because of the slope, slumping, and freezing and thawing in spring and fall. Hydroseeding is a good way to revegetate areas that have been cut and filled. Roadbeds should be built on the natural soil, where possible, to minimize slumping. Out-sloping road surfaces are needed to remove water because ditchbanks tend to slump. Because unsurfaced roadbeds are easily eroded and travel is very difficult during wet periods, the roads should be surfaced and properly maintained for year-round use.

The capability subclass is VIIe. Based on northern red oak as the indicator species, the woodland ordination symbol is 2R.

WtB—Whiteside-Tuckasegee complex, 2 to 8 percent slopes. This map unit occurs mainly as areas of a gently sloping, very deep, moderately well drained Whiteside soil and a well drained Tuckasegee soil. The unit is on toe slopes and along drainageways in coves in the intermediate mountains, primarily in the southern part of the county. Typically, the Tuckasegee soil is between drainageways and the Whiteside soil is along the drainageways. Individual areas are bowl shaped in the lower part and long and narrow further up the drainageways. They range from 2 to 30 acres in size. Typically, they are 35 to 45 percent Whiteside soil and 35 to 45 percent Tuckasegee soil. The two soils occur as areas too intricately mixed and too small to be mapped separately.

The typical sequence, depth, and composition of the layers in the Whiteside soil are as follows—

Surface layer:

0 to 14 inches, very dark grayish brown fine sandy loam

Subsoil:

14 to 24 inches, yellowish brown sandy clay loam that has streaks of very dark grayish brown in old root channels

24 to 30 inches, yellowish brown sandy clay loam that has strong brown and gray mottles

30 to 47 inches, gray fine sandy loam that has yellowish brown and gray mottles

Underlying material:

47 to 53 inches, light brownish gray sandy loam that has brownish yellow mottles

53 to 70 inches, gray sandy clay loam that has yellowish brown mottles

The typical sequence, depth, and composition of the layers in the Tuckasegee soil are as follows—

Surface layer:

0 to 11 inches, very dark brown gravelly loam

Subsoil:

11 to 24 inches, dark yellowish brown loam and gravelly loam

24 to 60 inches, yellowish brown gravelly fine sandy loam and gravelly sandy clay loam

Permeability is moderate in the Whiteside soil and moderately rapid in the Tuckasegee soil. The depth to bedrock is more than 60 inches. Surface runoff is slow in areas where undisturbed forest litter is on the surface and medium where the litter has been removed. Runoff from the higher adjacent areas is concentrated in concave areas, where water may pond. The seasonal high water table is 1.5 to 3.0 feet below the surface in areas of the Whiteside soil and more than 6 feet below the surface in areas of the Tuckasegee soil.

Included in mapping are areas of Dellwood, Nikwasi, and Sylva soils. Dellwood and Nikwasi soils are subject to flooding. Sylva soils are poorly drained. Nikwasi soils are poorly drained or very poorly drained. Included soils make up about 15 percent of this map unit.

Also included in mapping are soils that are similar to the Whiteside and Tuckasegee soils but have a dark surface layer that is less than 10 or more than 20 inches thick. Where the surface layer is less than 10 inches thick, the soils are in convex areas. Where the surface layer is more than 20 inches thick, the soils are in concave areas.

Most of the acreage in this map unit is cleared of trees and used for high-value row crops, pasture, hay, specialty crops, or building site development. Most of the acreage in this map unit on U.S. Forest Service lands is used for commercial timber or recreational purposes.

This map unit is well suited to high-value row crops, such as cabbage and broccoli (fig. 17). The slope, the moderate hazard of erosion, and runoff from the surrounding uplands are the main management concerns. Ponding in concave areas of the Whiteside soil may delay spring planting in some fields. Grassed waterways, diversions, and field borders are needed to control surface runoff and erosion. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat.

This map unit is well suited to pasture and hayland. The slope, soil compaction, and runoff from the higher surrounding uplands are the main management concerns. Land shaping before establishing pasture and hay helps to open outlets and drain surface water from depressions. Grazing during wet periods causes compaction, increases the hazard of ponding, and reduces the rate of water infiltration.

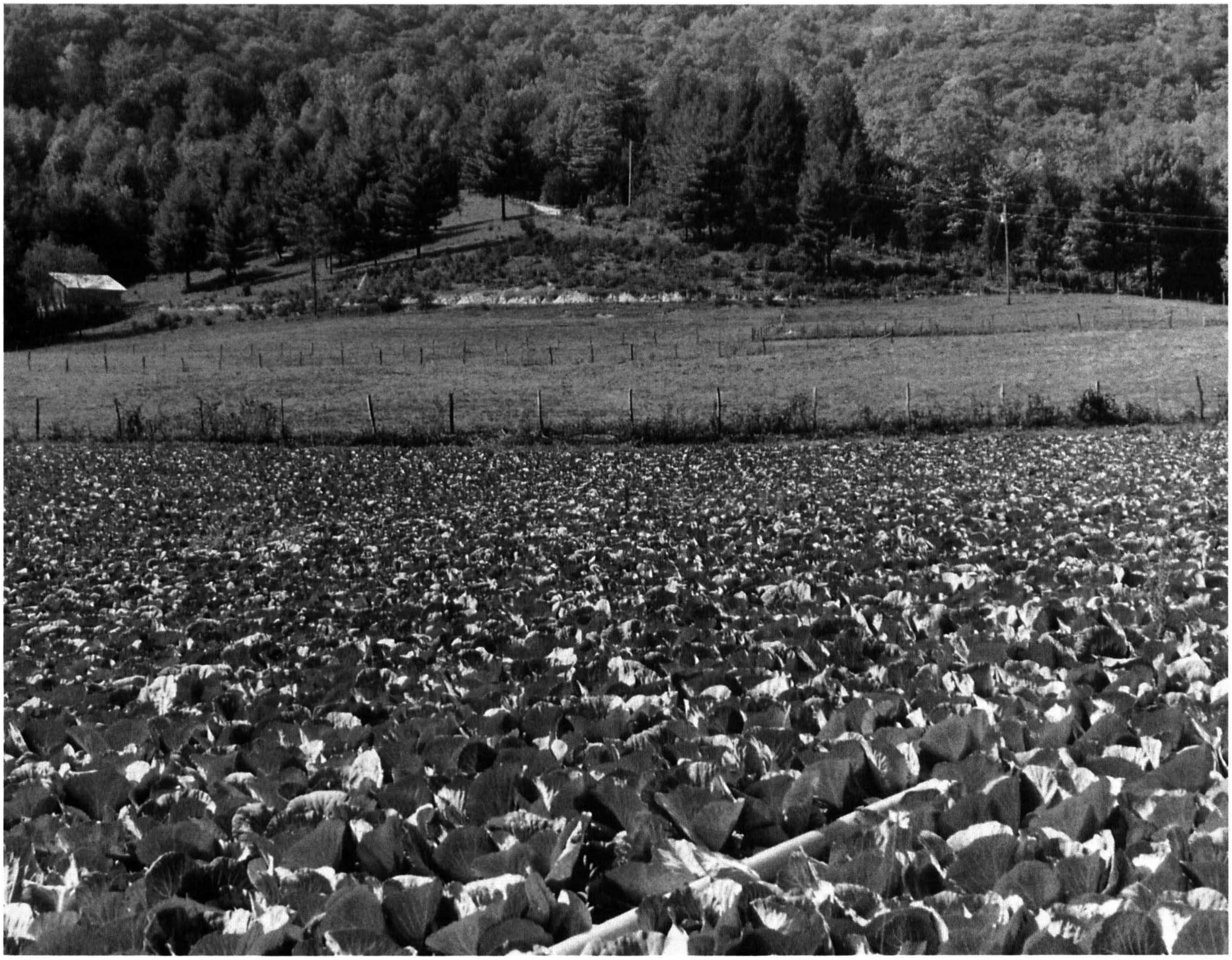

Figure 17.—Cabbage in an area of Whiteside-Tuckasegee complex, 2 to 8 percent slopes.

This map unit is well suited to specialty crops. Runoff from the higher surrounding uplands and the hazard of ponding in depressions are the main management concerns. The wetness in the Whiteside soil may interfere with the growth of Fraser fir. The most common landscaping plants are eastern hemlock, Norway spruce, mountain laurel, dogwood, dog hobble, white birch, Bradford pear, and rhododendron. Fraser fir and eastern white pine are commonly grown for use as Christmas trees. This map unit is well suited to trees and other plants that must be dug during harvesting. Water management practices similar to those used in row crops are appropriate. Vegetative filter strips can control erosion, improve water quality, and provide wildlife habitat. Establishing and maintaining sod in appropriate areas minimize erosion and help to control runoff.

This map unit commonly is not used for commercial timber on private land. It is used for commercial timber, however, on U.S. Forest Service lands. Plant competition and runoff from the higher adjacent areas are the main management concerns. Yellow-poplar is the most common tree. Other common trees include black cherry, American beech, northern red oak, sugar maple, yellow buckeye, white oak, red maple, yellow birch, sweet birch, black locust, eastern hemlock, and eastern white pine.

Hardwoods generally are preferred in stands that

have the potential for reforestation through sprouting and where hardwood seedlings are available. In cutover stands cutting all of the trees and large shrubs increases the number and quality of the sprouts. When stands are thinned, black cherry, northern red oak, and sugar maple generally are left standing.

Eastern white pine commonly is planted in old fields and other areas where the potential for reforestation through sprouting is not good and hardwood seedlings are not available. Planting genetically improved species results in better stands than the stands of naturally seeded eastern white pine. Preparing a site by prescribed burning or applications of herbicide increases the seedling survival rate and controls plant competition. Preparing a site by prescribed burning also minimizes the amount of debris and lowers planting costs. Plant competition should be controlled again a few years after planting.

Restricting the use of heavy equipment to dry periods or to periods when the ground is frozen helps to prevent soil compaction. When these soils are wet, skid trails and unsurfaced roads are erodible and very slick because of the content of organic matter in the surface layer and runoff from the higher surrounding uplands.

The Whiteside soil is poorly suited to building site development. The wetness and runoff from the surrounding uplands are the main management concerns. The Tuckasegee soil is well suited to building site development. Buildings should be designed so that runoff from the surrounding uplands is diverted.

This map unit is moderately suited to recreational uses. The wetness is the main limitation. The Tuckasegee soil is well suited to recreational uses. The unit commonly is used for campsites and hiking trails. Water sources, such as springs and streams, are common in areas of this unit.

This map unit is moderately suited to access roads. The wetness and runoff from the adjacent uplands are the main management concerns. The roads should be designed so that runoff from the adjacent uplands is diverted.

The capability subclass is IIe. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7A in areas of the Whiteside soil and 8A in areas of the Tuckasegee soil.

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Prime Farmland

In this section, prime farmland is defined and the soils in Jackson County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 8 percent.

The map units listed in table 5 are considered prime farmland in Jackson County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Some soils that have a high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. If applicable, the need for these measures is indicated in parentheses after the map unit name in table 5. Onsite evaluation is necessary to determine whether or not limitations have been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Generally, the soils in Jackson County that are well suited to crops are also well suited to urban uses. The data concerning specific soils in the county can be used in planning future land use patterns. The potential for farming should be considered relative to any soil limitations and the potential for nonfarm development.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very steep slopes can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Sally Stokes, district conservationist, and Bobby G. Brock, conservation agronomist, Natural Resources Conservation Service, and Kenneth McCaskill, county director, North Carolina Cooperative Extension Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified. The system of land capability classification used by the Natural Resources Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units" and in the tables. Specific information can be obtained from the local office of the Natural Resources Conservation Service or the North Carolina Cooperative Extension Service.

In 1990, about 6,456 acres was used for crops, pasture, and hay in Jackson County. Of this total, 5,300 acres was used as permanent pasture or hayland and 1,156 acres was used as cropland.

Agriculture in the county can be divided into three primary sectors—ornamental crops; high-value, small acreage field crops; and grain and forage crops associated with beef and dairy farming.

Ornamental Crops

Ornamental crops that are grown in Jackson County are Christmas trees and Christmas tree seedlings, native ornamentals, hybrid ornamentals, other woody ornamentals, outdoor flowers, and ginseng. These crops have the potential for high income, but they are relatively long-term investments that require intensive management. The ornamental crops that are grown in the county are concentrated in the southern and eastern parts and along the major streams.

Fraser fir is the most important species grown for use as Christmas trees. It is well adapted to loamy soils on north- to east-facing slopes at elevations above 3,000 feet. Plott, Tuckasegee, Cashiers, and Whiteside soils

commonly are used for growing Fraser fir for use as Christmas trees. Chandler, Fannin, and Edneyville soils are also suited to Fraser fir in high rainfall areas, such as the Glenville-Norton, Pine Creek, and Yellow Mountain areas. Fraser fir seedlings are commonly grown on the sandier, coarse textured soils on flood plains, such as Biltmore, Rosman, and Reddies soils along the Tuckasegee River and its major tributaries.

The soils on south- to west-facing slopes that are too hot and dry to grow Fraser fir commonly are planted to eastern white pine. Evard, Cowee, Edneyville, Chestnut, and Braddock soils commonly are used for growing eastern white pine for use as Christmas trees.

Native ornamentals, such as mountain laurel, dog hobble, mountain andromeda, rhododendron, eastern hemlock, and Carolina hemlock, also are grown commercially in the county. These plants grow well at higher elevations, generally above 3,000 feet. Native ornamentals can also be grown at lower elevations under the proper conditions. Native ornamentals that are balled and burlapped are better adapted to medium textured soils, such as Saunook and Tuckasegee soils. Those that are bare-root harvested are better adapted to coarse textured soils, such as Biltmore, Rosman, and Reddies soils. At higher elevations, these plants need protection from the strong winter winds.

Hybrid ornamentals, such as Chinese hollies, Japanese hollies, red leaf photenia, junipers, and outdoor flowers, are also grown in the county. These plants are better adapted to well drained, very deep, medium textured soils at lower elevations in the valleys. Saunook soils commonly are used for hybrid ornamentals.

Ginseng is a plant that is native to the county. It is grown commercially in several locations throughout the county. It commonly is grown under stands of white pine or under protective shade cloth in cool sites in coves. Saunook and Tuckasegee soils commonly are used for growing ginseng. Stones on the surface are a significant management problem in many sites that could be used to grow ginseng.

High-Value, Small Acreage Field Crops

High-value, small acreage field crops, such as cabbage, broccoli, tomatoes, and burley tobacco, commonly are grown in Jackson County. These crops require intensive management and a high input of labor.

Cabbage and broccoli generally are grown at elevations above 3,000 feet in the Glenville-Norton, Pine Creek, and Yellow Mountain areas of the county, where rainfall during the growing season is high. Some cabbage and broccoli are also grown along the Tuckasegee River and its major tributaries. Tuckasegee, Whiteside, Edneyville, Biltmore, Rosman, and Statler soils commonly are used for cabbage and broccoli.

Tomatoes and burley tobacco are grown mainly on soils on flood plains and stream terraces in the central and northern parts of the county. These crops grow best in well drained, very deep, medium textured soils. Saunook, Statler, Rosman, and Dillsboro soils commonly are used for tomatoes and burley tobacco.

Grain and Forage Crops

Grain and forage crops associated with beef and dairy farms are scattered throughout the county and are grown on a wide variety of soils. Corn and other grains and forage crops commonly are grown on soils on flood plains and stream terraces where equipment can be used. Soils that have a slope of more than 30 percent should not be used because equipment cannot operate safely on these soils. Braddock, Dillsboro, Cullowhee, Rosman, Reddies, and Statler soils commonly are used for grain and forage crops.

Water Management

Soils on flood plains in Jackson County are very productive and intensively used for agricultural crops but require a high level of management for optimum production. Swift floodwaters can result in partial or complete losses of crops during the growing season. Scouring by swift floodwaters can severely damage soils on flood plains. Wetness is also a major limitation on some soils, such as Cullowhee and Nikwasi soils, that are on flood plains along the smaller streams. Installing a tile drainage system on these soils is difficult but necessary for optimum crop production.

Management of surface water is also important on soils on flood plains that are used as cropland. Diversions, grassed waterways, and land smoothing are a few measures that control the hazard of erosion. Onsite investigation is essential before proper management can be determined.

Erosion Control

Erosion is a major hazard on soils in the uplands that are used as cropland in Jackson County. Soils on uplands that have a slope of more than 4 percent are susceptible to erosion, and the hazard of erosion increases on the steeper and longer slopes. Erosion is costly for several reasons. Topsoil, water, pesticides, fertilizers, lime, and organic matter are lost if erosion is not controlled. Productivity decreases, and sediments, agricultural chemicals, and nutrients pollute streams, lakes, and reservoirs. Trout streams are especially sensitive to damage caused by sediments.

Conservation tillage is the most effective erosion-control measure used in the county. Soil and water are

conserved by providing a year-round cover, such as stubble left during no-till farming. No-till farming also minimizes evaporation during the growing season and improves tilth. Many areas of cropland are downslope from steep pastures, and runoff from these pastures results in a serious hazard of erosion in those areas of cropland. Diversions can intercept this runoff and route it to a safer outlet, such as a grassed waterway.

Stripcropping is also an effective resource management system, but the small size of fields in the county minimizes its use. Where practical, stripcropping provides effective soil and water conservation through rotations of crops and grasses, crop residue, and cover crops. An effective resource management system can also include diversions, field borders, and grassed waterways.

Pasture and Hayland Management

Pasture and hayland in Jackson County contain a wide variety of soil types, many of which are together in an individual field. In the same pasture, poorly drained soils on flood plains are often adjacent to the steeper, well drained soils on uplands. Because of these landscape conditions, droughtiness and wetness are often in the same pasture.

Pastures are common on soils that have a slope of more than 30 percent. Such pastures are very difficult to manage. Proper fertility is difficult to maintain, and woody vegetation, especially multiflora rose and black locust sprouts, are very hard to control.

In many areas, concentrated rotational grazing is effective so that the animals can better utilize all of the forages in the pasture. Fencing livestock out of the pastures on clayey soils during wet periods, however, helps to prevent severe compaction. Overgrazing results in runoff and a severe hazard of erosion on pastures on the steep mountains. Good pasture and hayland management measures conserve soil and water while improving water quality.

Chemical Weed Control

The use of herbicides for weed control is a common practice on the cropland in Jackson County. It decreases the need for tillage and is an integral part of reduced tillage operations. Selected soil properties, such as organic matter content and texture of the surface layer, affect the rate of herbicide application. Estimates of both of these properties were determined for the soils in the county. Table 15 shows a general range of organic matter content in the surface layer of the soils. The texture of the surface layer is shown in the USDA texture column in table 14.

In some areas the organic matter content projected for the different soils is outside the range shown in table 15. The content can be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation may have a higher content of organic matter in the surface layer than similar soils that have been cultivated for a long time. Conservation tillage tends to increase the content of organic matter in the surface layer. A lower content of organic matter is common where the surface layer has been partly or completely removed by erosion or land smoothing.

Soil Fertility

The soils in Jackson County generally are low in natural fertility. They are naturally acid. Additions of lime and fertilizer are needed for the production of most kinds of crops. Ellijay soils, which formed from ultramafic rocks, are less acid but have a severe calcium-magnesium imbalance.

Liming requirements are a major concern on cropland. The acidity level in the soil affects the availability of many nutrients to plants and the activity of beneficial bacteria. Lime also neutralizes exchangeable aluminum in the soil and thus counteracts the adverse effects high levels of aluminum on many crops. Liming adds calcium (from calcitic lime) or calcium and magnesium (from dolomitic lime) to the soil.

A soil test is a guide to what amount and kind of lime should be used. For example, Ellijay soils have a high level of magnesium; and dolomitic lime should not be used. Calcitic lime helps to restore the proper calcium-magnesium ratio. Dolomitic lime is appropriate to use, however, on most of the other soils in the county. Also, the desired pH levels may differ, depending on the crop to be grown.

Nitrogen fertilizer is required for most crops. It is generally not required, however, for clover that is established or for alfalfa or other legumes that can extract nitrogen from the air. A reliable soil test is not available for predicting nitrogen requirements. Appropriate rates of nitrogen application are described in the section "Yields per Acre."

Soil tests can indicate the need for phosphorus and potassium fertilizer. They are needed because phosphorus tends to build up in the soil.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other weather factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension

agents. Available yield data from similar soils in nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

A high level of management includes maintaining proper soil reaction and fertility levels as indicated by standard soil tests. The application rate of nitrogen for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds per acre. If the yield potential for corn is only 100 bushels per acre or less, a rate of 100 to 120 pounds of nitrogen per acre should be used. The application of nitrogen in excess of that required for potential yields generally is not recommended. The excess nitrogen fertilizer that is not utilized by a crop is an unnecessary expense and causes a hazard of water pollution. Because nitrogen can be readily leached from sandy soils, such as Biltmore soils, several small applications may be needed on these soils throughout the growing season.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the North Carolina Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland *(19)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Land capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the land capability classification system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c.*

The capability classification of each map unit component is given in the section "Detailed Soil Map Units" and in table 6.

Woodland Management and Productivity

Albert Coffey, forester, Natural Resources Conservation Service, helped prepare this section.

Owners of woodland in Jackson County have many objectives. These objectives include producing timber; conserving wildlife, soil, and water; preserving aesthetic values; and providing opportunities for recreational activities, such as commercial hunting. Public demand for clean water and recreational areas creates pressures and opportunities for owners of woodland.

The landowner interested in timber production is faced with the challenge of producing greater yields per acre. Meeting this challenge requires intensive management and silvicultural practices. Many modern silvicultural techniques resemble those long practiced in agriculture. They include establishing, weeding, and thinning a desirable young stand; propagating the more productive species and genetic varieties; providing short rotations and complete fiber utilization; and controlling insects, diseases, and weeds. Even though timber crops require decades to grow, the goal of intensive management is similar to the goal of intensive agriculture. This goal is to produce the greatest yield of the most valuable crop as quickly as possible.

Jackson County has a total of 276,537 acres of woodland *(18)*. Extensive hardwood forests in the Appalachian Mountains that are part of one of the largest hardwood ecosystems in the world are in the county *(17)*. Commercial forests cover 263,288 acres, or about 83 percent of the land area in the county *(18)*. Commercial forest is defined as land that is producing or is capable of producing crops of industrial wood (at least 20 cubic feet per acre per year) and that has not been withdrawn from timber production. In the county, 12,722 acres of reserved timberland are not available for commercial timber production because of legislative or administrative decisions. The reserved timberland includes areas that have both commercial and noncommercial potential. An additional 527 acres of noncommercial woodland in the county produces less than 20 cubic feet per acre per year and is not in timberland reserve.

Some of the most important timber species in the county are northern red oak, white oak, black cherry, yellow-poplar, and white pine. They are adapted to the soils and climate. Generally, these species bring the highest average sale value per acre.

For management purposes timber sites are generally placed in a forest type group, such as yellow-poplar, oak-hickory, northern red oak, shortleaf pine, eastern white pine, or red spruce-Fraser fir. The characteristics of a given site are often indicated by the forest type on that site. In places, the effects of past management determine the current forest type. Some sites are well suited to more than one forest type *(14)*.

Yellow-poplar. This forest type most commonly is in coves and drainageways. It produces the highest volume of wood per acre of all the forest types in the county. Yellow-poplar is, by far, the most common species in areas of this forest type. Stands also have numbers of northern red oak, white oak, black cherry, sweet birch, eastern hemlock, black locust, American basswood, sugar maple, and yellow buckeye. At elevations of more than 4,000 feet, yellow-poplar is less dominant and northern red oak, black cherry, sweet birch, yellow birch, eastern hemlock, American beech, and sugar maple are more common. Northern red oak, white oak, black cherry, and sugar maple are more valuable than yellow-poplar. They are favored in timber management practices. Soils that commonly support this forest type include Saunook, Tuckasegee, Cullasaja, Spivey, Santeetlah, and Whiteside soils.

Oak-hickory. This forest type is on side slopes and ridges on south to west aspects at elevations as high as about 4,800 feet. It is the most extensive forest type in the county. It produces the lowest volume of wood per acre and shows the most effects of past high grading. Sites of this forest type are hotter and drier than sites of the northern red oak forest type. If properly managed, this forest type can produce high-quality timber. Dominant species are scarlet oak, chestnut oak, black oak, and hickories. Associated species include white oak, red maple, pitch pine, and eastern white pine. Soils that commonly support this forest type include Chestnut, Cowee, Edneyville, Evard, Fannin, Chandler, Brasstown, Junaluska, Soco, Stecoah, and Tsali soils.

Northern red oak. This forest type is on uplands that have a cool aspect at elevations of about 3,000 to 5,300 feet. Below an elevation of 4,000 feet, it is mainly on north- to east-facing side slopes. Above an elevation of 4,500 feet, it is on ridges and side slopes on various aspects. Northern red oak is the most common species. Yellow-poplar, black cherry, American beech, sweet birch, yellow birch, and sugar maple make up a large part of many stands. Associated species that require cool temperatures, such as yellow buckeye and eastern hemlock, are common in some stands. A large percentage of the trees on this forest type are of valuable species, and thus this forest type commonly has the most valuable stands of timber. Soils that commonly support this forest type include Plott, Trimont, Cashiers, and Cheoah soils. Above an elevation of 4,800 feet, soils that commonly support this

forest type are Wayah, Burton, Craggey, and Oconaluftee soils. Most of the soils at elevations of more than 4,800 feet are not used as sites for commercial timber production. The trees at these higher elevations grow slowly and have poor form because of frequent ice storms and high winds.

Shortleaf pine. This forest type is in areas that have been cleared of trees and reseeded or planted to pine. It most commonly is on ridges and south- to west-facing side slopes in the low mountains. Shortleaf pine, pitch pine, and Virginia pine are the prevalent species in areas of this forest type. This forest type is of medium acreage. Associated dry site hardwoods include scarlet oak, chestnut oak, blackgum, and sourwood. Soils that commonly support this forest type include Evard, Cowee, Brasstown, Junaluska, and Tsali soils.

Eastern white pine. This forest type occurs naturally in the southern and eastern parts of the county. In many areas, however, it has been planted. It most commonly is on ridges and side slopes that previously supported the oak-hickory forest type or in abandoned pastures. These areas were converted because eastern white pine produces more volume and has shorter rotations than the trees of the oak-hickory forest type. Soils that commonly support this forest type are Chandler, Fannin, Cashiers, Edneyville, and Chestnut soils.

Red spruce-Fraser fir. This forest type occurs in the high mountains at elevations of more than 5,300 feet. It is mainly in the eastern part of the county along the Haywood County line. Jackson County is the southernmost area of this forest type. In most areas, it is in noncommercial timber, and the acreage is decreasing because of infestations of the balsam woolly aphid and various environmental factors. Because of these factors, many Fraser fir trees are dead or dying and red spruce is common in most stands. Fraser fir seedlings are abundant, however, on the forest floor. Soils that commonly support this forest type are Wayah, Oconaluftee, Tanasee, Balsam, Burton, and Craggey soils.

One of the first steps in planning intensive woodland management is to determine the potential productivity of the soil for several alternative tree species. The most productive and valued trees are then selected for each soil type. Site and yield information enables a forest manager to estimate future wood supplies. These estimates are the basis of realistic decisions concerning expenses and profits associated with intensive woodland management, land acquisition, or industrial investments.

The potential productivity of woodland depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure, and depth to the water table, affect forest productivity primarily by influencing available water capacity, aeration, and root development. The net effects of the interaction of these soil properties and site characteristics determine the potential site productivity.

Other site factors are also important. The gradient and length of slopes affect water movement and availability. Sites on concave slopes are more productive than those on convex slopes because available water is greater. Elevation and aspect affect the amount of sunlight a site receives and the rate of evaporation. Sites on south- to west-facing slopes are warmer and drier than those on north-facing slopes, except where the south- to west-facing slopes are shaded by the higher mountains (fig. 18). The shading produces the cooler microclimate common on north- to east-facing slopes. The best sites are generally on north to east aspects on the lower slopes, in sheltered coves, and on gently sloping, concave slopes. The amount of rainfall and length of growing season influence site productivity. Areas that receive 60 inches or more of rainfall per year generally are good sites for timber production even if the soil properties are not the best. Generally, as rainfall increases, site productivity is greater.

In the eastern and southern parts of the county, where the average annual precipitation is 80 inches or more, natural stands of eastern white pine that have a site index in the high eighties produce 150 to 160 cubic feet per acre per year and have a productivity class of 11. In parts of the county that have 60 inches of rainfall or less and the same soils, the site index is in the low seventies and the volume of timber is almost half of that recorded in areas that have a higher amount of rainfall. Productivity increases as the present stands are harvested and are replaced by genetically improved trees with proper stocking.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

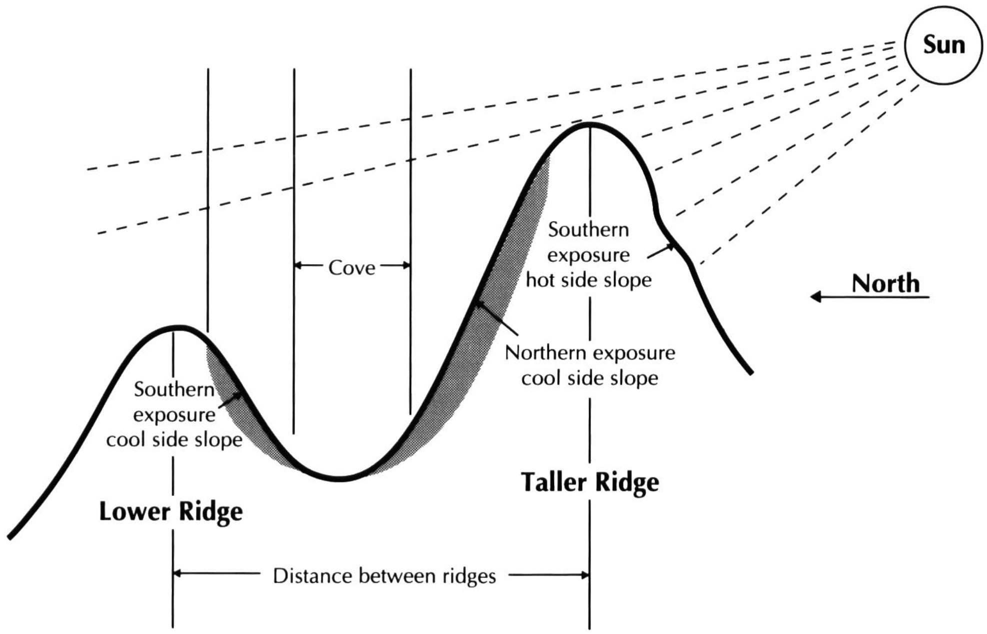

Figure 18.—The steep, rugged mountains in Jackson County vary in size. In many areas the high mountains shade the low and intermediate mountains.

Table 7 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare per year. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of the slope. The letter *X* indicates that a soil has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable trees. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As slope gradient and length increase, the use of wheeled equipment becomes more difficult, and tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems, such as a cable yarding system, are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The

rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of the naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of time when the water table is high, amount of rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock. Special site preparations, such as providing artificial shade for seedlings, may be required. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. The rooting depth can be restricted by a high water table, a fragipan, or bedrock or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds break trees but do not uproot them; *moderate* if strong winds blow a few trees over and break many trees; and *severe* if moderate or strong winds commonly blow trees over. Ratings of moderate or severe indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. The predominant common trees are listed in table 7 in the order of their observed occurrence. Additional species that commonly occur on the soils may be listed in the detailed soil map unit descriptions. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most valuable on a given soil.

For soils that are commonly used for timber production, the yield is predicted in cubic feet per acre per year. It is predicted at the point where mean annual increment culminates. The estimates of the productivity of the soils in this survey are based mainly on yellow-poplar, northern red oak, chestnut oak, shortleaf pine, Virginia pine, scarlet oak, red spruce, and eastern white pine *(3, 8, 10, 12)*.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years (50 years in this survey). This index applies to fully stocked, even-aged, unmanaged stands. Productivity of a site can be improved through management practices, such as bedding, ditching, managing water, applying fertilizer, and planting genetically improved species.

Site indices were assigned using available plot data and comparison curves. Where sufficient plot data exists, a site index was assigned based on data from soils that have similar properties. The site index may vary considerably among sites that have the same soil, especially in the mountains, because of the influence of climate, relief, landform position, aspect, drainage, and elevation.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation. If hardwoods are desired on a forest site, acceptable species should naturally reproduce from seeds and sprouts. Special site preparation techniques may be required. Planting of hardwoods on a specific site should be based on the recommendations of a forester. Fraser fir is planted for use as Christmas trees only.

Recreation

Jim Borawa, fisheries biologist, North Carolina Wildlife Resources Commission, helped prepare this section.

The soils in Jackson County play an important role in determining the types of recreational uses, such as hiking, camping, snow skiing, boating, or sightseeing. Knowledge of the soils is valuable for managing areas that have the potential for recreational development.

The Blue Ridge Parkway lies along the northeast border of the county. It attracts millions of people each year, especially during the fall color season in October. The scenic beauty is enjoyed by campers, hikers, fishermen, hunters, sightseers, and photographers. The high peaks and areas of rock outcrop throughout the county provide some of the best scenic views in the area, especially at Richland Balsam, which is the highest peak on the Blue Ridge Parkway at an elevation of 6,053 feet. This area is in a relict forest of red spruce and Fraser fir interspersed with natural balds. Wayah, Balsam, Tanasee, Burton, and Craggey soils are the most common soils along the Blue Ridge Parkway in Jackson County.

The soils in the Cleveland-Chestnut-Rock outcrop complex are in similar areas but at lower elevations, such as on Whiteside Mountain in the southern part of the county. Whiteside Mountain is the highest rock cliff in the eastern United States and is visited by many tourists annually.

The Cherokee Indian Reservation in the northern part of the county provides many cultural features, such as the drama "Unto These Hills" and the Oconaluftee Indian Village, which is a replica of a historic Cherokee Indian village. Fishing is also permitted on several streams on the reservation, and fishing permits may be obtained on a daily basis. Many of the soils in this survey bear Cherokee names, such as Junaluska, Tsali, Wayah, Soco, Stecoah, and Nikwasi.

The county also is only a short distance from the entrance to the Great Smoky Mountains National Park, which is one of the major tourist attractions in the East. The Great Smoky Mountains provide miles of scenic rivers and hiking trails for campers and outdoor enthusiasts who enjoy beautiful scenery. Fishing in the park is allowed by permit, but no hunting is allowed. A major part of the Appalachian Trail also crosses the Great Smoky Mountains.

More than 68,000 acres of the Nantahala National Forest is in the county. This National forest provides several miles of hiking and backpacking trails and numerous designated campsites. Part of the forest was designated as the Ellicott Rock Wilderness in the early 1980's. Hunting is allowed on part of these public lands, and several miles of native trout waters are in this area. The Chattooga River, which is in the Ellicott Rock Wilderness, is well known for white water canoeing and rafting. Whitewater Falls, which at 411 feet is the second highest waterfall in the eastern United States, is on the Whitewater River between Jackson and Transylvania Counties and is a major scenic attraction in the southeastern part of the county.

The headwaters of the Tuckasegee River are in Jackson County, and the river flows through the county. It provides such activities as canoeing, rafting, tubing, camping, picnicking, and fishing. In the county, about 50 miles of waters, including the Tuckasegee River, are stocked with trout. Rainbow trout, brown trout, and muskellunge are common game fish in the Tuckasegee River. Access to the river is easier in areas where the topography is flatter, especially along flood plains or stream terraces. Some of these areas are used for playgrounds, ball fields, and picnic areas because of the scenic value and the flatter terrain.

Fishing and boating are major recreational activities in the county on Lake Thorpe, Bear Lake, Wolf Lake, and Cedar Cliff Lake. These lakes have access for public boating and are populated with largemouth bass, brim, walleye, crappie, and trout. These lakes also provide good water skiing.

The areas around Cashiers and Sapphire in the southern part of the county offer such activities as golf, tennis, horseback riding, and snow skiing.

Western North Carolina and Jackson County attract millions of people annually who enjoy outdoor recreational opportunities and scenic beauty. This area of the state continues to attract visitors because it is near large, populated areas, such as Atlanta, Georgia; Washington, D.C.; Charlotte, North Carolina; and Knoxville, Chattanooga, and Nashville, Tennessee.

In table 8, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed

as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Dr. Richard Bruce and Dr. Jerry West, Western Carolina University; L. Hilman and L. Luckett, U.S. Forest Service; R. Porterfield and J. Davies, North Carolina Wildlife Resources Commission; and John P. Edwards, biologist, Natural Resources Conservation Service, helped prepare this section.

Soils are a major factor in determining the amount and distribution of food, water, and cover available for wildlife habitat. The many soils in Jackson County help to form a diversity of wildlife habitat that can support many wildlife species. Soils affect the kind and amount of vegetation available to wildlife as food and cover. They also affect the construction of water impoundments and the presence of springs and seeps.

Knowledge of soil types and the plant communities they support is valuable in managing wildlife. Generally, wildlife occupy the soils that are most suitable for food, water, and cover requirements. Soils that have good potential for wildlife habitat do not always support a large population of wildlife. Human activities can force wildlife onto soils that support less desirable habitat. This can adversely affect the kinds and numbers of wildlife.

Understanding soil-vegetation relationships is important in creating and maintaining productive wildlife habitat areas. Soil surveys can be used in management programs, such as habitat improvement, species reintroduction, and the creation of wildlife refuges.

The soils of the county support vast areas of woodland wildlife habitat. Many areas of woodland are in mature mixed hardwoods that produce a variety of hard and soft mast. Black bear, turkey, gray squirrel, and woodpeckers, in particular, benefit from such habitat. Edneyville, Evard, Cowee, and Chandler soils on the warm south aspects provide food and cover, such as oaks, hickory, dogwood, pine, and mountain laurel. The cooler north-facing soils, such as Plott, Cashiers, and Trimont soils, support a plant community consisting of yellow-poplar, American beech, black cherry, and rhododendron. Areas of the shallow Cleveland soils and rock outcrop support many varieties of lichens, grasses, and forbs. Also, the many twisted and dead trees associated with Cleveland soils and areas of rock outcrop serve as important nesting places for woodland wildlife.

The availability of water and moisture is a key element in wildlife habitat. Soils in coves, such as Cullasaja, Tuckasegee, Whiteside, and Sylva soils, have a cool, moist environment and frequently have

seeps, springs, or small streams. Boulders, stones, or dense thickets of rhododendron on these soils also provide cover for wildlife. Raccoon and ruffed grouse frequent these areas for food and cover. Salamanders and other amphibians benefit from the moisture in the coves. Soils in coves on warm, south-facing slopes contribute to wildlife habitat by providing moisture and a diversity of plants to an otherwise uniform plant community.

Woodland wetlands along the larger rivers and streams also contribute to habitat diversity. Nikwasi soils support a dense plant cover, such as rhododendron, red maple, and dog hobble. Raccoon, mink, beaver, and many reptiles and amphibians utilize this habitat.

The cool water resources of the county support brook trout, brown trout, and rainbow trout. The cooler rivers have a small population of smallmouth bass, and walleye are in Lake Thorpe. Largemouth bass, bluegill, crappie, and other sunfish are dominant in the warm water lakes and ponds.

The severe climate at high elevations limits the potential for diversity among tree species. Such soils as Wayah and Oconaluftee soils support yellow birch, sweet birch, and northern red oak. They also commonly support pure stands of red spruce and Fraser fir. The dense stands of red spruce and Fraser fir support red squirrels and several less common species of salamander. The soils on high elevations support many varieties of soft mast, forbs, and grasses, especially on balds and in open areas. Black bear, ruffed grouse, cottontail rabbit, small numbers of deer, and other animals utilize these areas. Hawks and other birds of prey use the open areas for hunting.

The size and remoteness of the habitat at high elevations is critical in some wildlife management programs. These areas are becoming increasingly important to species that require large tracts of habitat, such as the black bear. The balds in particular have the potential to support a small population of golden eagles that has been reestablished in the county. Shallow, rocky crags in areas of Burton and Craggey soils and areas of rock outcrop have already served as suitable habitat for the reintroduction of the endangered peregrine falcon to the county.

Many open areas are the result of human activities. Generally, open spaces in the county occur mainly on the less sloping landscapes at the lower elevations. Such soils as Nikwasi, Dellwood, Cullowhee, Rosman, Statler, Dillard, Braddock, and Hemphill soils are commonly used for agricultural purposes, which often benefit wildlife species. The complex soil and vegetation patterns associated with the open areas at the lower elevations provide the most habitat diversity when suitable woodland cover is nearby.

Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. In open areas, soil conservation measures, such as field borders and vegetative filter strips, provide the needed food and cover. Establishing plant cover along access roads helps to provide food for wildlife and helps to prevent the sedimentation of lakes and streams. Many woodland management techniques can be used to increase the potential for wildlife habitat. Openings in the forest canopy encourage plant diversity and subsequently increase the potential wildlife habitat for many species. The needs of wildlife habitat should be considered in all decisions involving the use of the land.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat. The ratings given in the table are intended to be used as a guide and are not site specific. Onsite investigation is needed for individual management plans.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface

stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, orchardgrass, Kentucky bluegrass, clover, sericea lespedeza, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, aster, and pokeberry.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, yellow-poplar, black cherry, apple, dogwood, hickory, American beech, greenbrier, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are hawthorn, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, and cedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, slope, and surface stoniness. Examples of wetland plants are smartweed, ferns, arrowhead, dog hobble, needlerush, cattail, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams or highway embankments. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are shallow depressions on flood plains and small ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, mourning dove, songbirds, hawks, cottontail rabbit, white-tailed deer, groundhog, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, bobcat, chipmunks, woodpeckers, gray squirrel, red squirrel, gray fox, raccoon, white-tailed deer, and black bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are wood ducks, herons, weasels, muskrat, mink, raccoon, and beaver.

Engineering

Howard Tew, area engineer, Natural Resources Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

The soils in Jackson County range from soils on flood plains and gently sloping terraces to soils on mountaintops and ridges at elevations above 6,000 feet. Landowners use the soils in the county for a wide range of purposes, from the production of burley tobacco to foundations for the construction of multi-unit condominiums. The soils in many areas of the county may be easily developed by conventional engineering design techniques. Other soils require considerable specialized engineering and construction techniques to overcome their inherent limitations. If construction problems are to be prevented, planning any engineering activity must consider the limitations of the soils. Soil interpretations for many uses are provided in the tables for planners to use in evaluating the limitations of the soil as potential construction sites.

A number of soil characteristics that pose difficulties in engineering are in the county. These characteristics are factors inherent to mountainous terrain and climate. Among the most important characteristics are the slope, instability caused by poor bearing or shear strength, stoniness, freeze-thaw action, seeps and springs, and the shallow depth to bedrock.

Slope. Many of the soils in the county are on slopes of more than 15 percent. Slopes commonly range up to 95 percent and in places are nearly vertical. The slope directly or indirectly influences the use of a soil in a number of ways. Runoff from watersheds that have large areas of steep and very steep slopes results in unusually high peak rates and flow velocities, especially in the areas of the county where rainfall totals between 80 to 100 inches annually. The design of water flow and impoundment structures must meet exacting standards to provide for this runoff. Ponds and sediment basins are likely to be damaged or may wash out if design and construction do not adequately handle peak runoff events. Damage to downstream areas and subsequent liability in case of a failure are primary considerations of design. Excavations on steep and very steep soils in the mountains commonly result in a severe hazard of erosion and offsite damage caused by sedimentation.

Erosion control on steep slopes presents a unique challenge. If runoff accumulates and moves down the steep and very steep slopes, a severe hazard of erosion occurs unless definite erosion-control measures have been taken.

Construction that requires significant cuts and fills on the steep and very steep slopes calls for careful planning and special construction techniques. Long and extremely steep fill slopes may result from cuts and fills on steep and very steep land. Fill slopes generally are dominated by saprolite and rock fragments. Generally, the saprolite is very infertile, and its reaction ranges from strongly acid to extremely acid. These characteristics result in difficulties in stabilizing the slope with vegetation.

The density of fill slopes generally is low and the porosity high. As water moves through a fill slope, settling occurs. As the pores fill with water, the fill slope gets heavier. This may cause severe slope failure. In many areas, soils that have a low content of mica are underlain by saprolite that has a high content of mica. When these fill slopes take in water, severe failure of the slope occurs at a lower water content than on fill slopes that do not have a high amount of mica. Detailed engineering testing and design are often needed before building on fill slopes to prevent damage from settling and slope failures.

Instability. Undisturbed soils must possess an inherent bearing strength to support loads, such as high fills, buildings, or vehicular traffic. Undisturbed, sloping

soils also should provide a degree of shear strength to support their own weight. Additional loading puts greater stress on the soil. When loading stresses exceed bearing or shear strength, the soils may move unpredictably. Loading stresses exceed bearing or shear strength on unstable soil material much more quickly than on stable soil material.

Soil material moves more freely when lubricated. Such lubrication of soils occurs where high concentrations of mica are in the soil. Mica can be detected by a shiny sparkle when the soil is struck by the sun or other bright light and by a slick, greasy consistence of the soil. Water also serves as a soil lubricant. If soil material becomes saturated, it tends to move away from the loading forces applied to it. Whether lubricated by natural particle characteristics or by water, a soil that moves provides very little shear strength. A micaceous soil or a soil that has seeps and springs is a poor choice for construction sites because of poor strength and susceptibility to slippage or landslides (fig. 19). Chandler, Cashiers, and Fannin soils in the eastern and southern parts of the county have a high content of mica. These soils are unstable because of the natural lubricants, mica, and high rainfall.

Metasedimentary soils in the northern part of the county, such as Oconaluftee, Cheoah, Stecoah, and Soco soils, are also unstable. In these soils, the instability results from the underlying bedrock, which lies in plates that in many places run about parallel to the natural slope of the land. These plates provide very little shear strength and tend to slide across one another when loaded.

Excavations and access road construction on the steep and very steep terrain remove the lateral support holding the soil back. In time, these soils may move downslope, resulting in damage to roads, structures, and streams. For example, the landslides along Dicks Creek Road in the northwestern part of the county are the result of the unstable soils losing their lateral support.

The soils on flood plains at the headwaters of the Tuckasegee River are made up predominantly of sand and gravel. These soils have little natural plasticity and may become unstable when saturated. Dellwood soils are an example. If not bound together by clay, these soils flow in a thick liquid slurry. Deep excavations are difficult to make in such soils and can be dangerous. Sidewalls cave in and slough off when lateral support is removed. Preventing cave-ins requires extensive shoring of the walls.

Most soils in the mountains contain rock fragments. Some soils, such as Spivey or Cullasaja soils, may be very stony throughout. Other soils in coves, such as Saunook soils, may have stones in some part of the profile. Soils on flood plains, such as Dellwood and Cullowhee soils, are underlain by a strata of smooth, water-rounded rocks, ranging from fine gravel to large cobbles. Other soils on flood plains, such as Rosman and Biltmore soils, do not have stone lines within a depth of 40 inches. The content of stones on some soils in the mountains, such as Stecoah and Edneyville soils, may vary from only a few scattered rock fragments to as much as 35 percent of the soil, by volume. At a specific location, the content of stones may vary greatly through the soil profile.

Construction and development require compaction of fill material to provide a firm foundation and impervious layers. Where an excess content of stones in fill material inhibits compaction, unacceptable settlement is likely to occur, resulting in damage to structures. Shallow excavations and fine grading may be difficult in excessively stony soils. Removal of rock fragments from stony soils is expensive and time consuming.

If soils are analyzed for engineering purposes, the content of stones should receive special emphasis. The Unified Soil Classification System (USCS) evaluates only the soil material less than 3 inches in diameter. For example, the USCS classification of material shown as SC (sand with clay fines) does not account for rock fragments larger than 3 inches; however, that soil may be very stony and not suited to fill material. The ranges for rock fragments larger than 3 inches are shown in table 14. Determining actual conditions requires onsite investigation.

Hard bedrock is at a depth of 10 to 40 inches in some soils in the county, such as Cleveland, Burton, and Craggey soils. Other soils, such as Chestnut, Cowee, Junaluska, Soco, and Tsali soils, have soft, weathered bedrock at a depth of 10 to 40 inches. Hard bedrock cannot be excavated by machinery. The surface of these restrictive features is undulating below the soil surface, and onsite investigation is needed to determine its topography before construction begins. Material excavated from soft, weathered bedrock is dry, brittle, and difficult to compact.

Freeze-thaw cycle. The soils in the county that are on south-facing slopes are exposed to continual freezing and thawing from November to March. Repeated winter freeze-thaw cycles create heaving and sloughing of the soils on the surface. Fine grained soils are the most susceptible to heaving.

Frost action loosens the surface of the soil and may heave it above its normal position. Subsequent thawing may leave the surface soil in a near liquid state. In this condition the soil is subject to erosion and has minimal

Figure 19.—Roads built on micaceous soils are subject to landslides.

load-supporting strength. Unprotected slopes experience extreme erosion, and access roads become impassable.

If a thaw does not affect the entire depth of a frozen soil, an unfrozen, heaved layer of soil is left on top of the frozen soil. Severe erosion can occur if rainwater is unable to penetrate the frozen soil and moves laterally across the surface of frozen material.

Frost heaving exerts considerable force on footings and foundations on susceptible soils. The potential for frost damage must be considered when structures are designed. Frozen soil resists compaction and should not be used as fill material if compacted densities are important. The depth of frost penetration varies with elevation and aspect across the county. North-facing slopes develop frost to a greater depth than other slopes. Frost penetration may exceed a depth of 36 inches in some years at the higher elevations in the county.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, hardness of bedrock, mica content, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture, mica content, underlying rock formations, susceptibility to freezing and thawing, and the depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, high mica content, and unstable underlying rock formations can cause the movement of footings. Depth to a high water table, depth to bedrock, large stones, mica content, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, the type of bedrock, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, mica content, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established. Soil tests are essential to determine liming and fertilizer needs. Help in making soil tests or in deciding what soil additive, if any, should be used can be obtained from the office of the Jackson Soil and Water Conservation District or the local office of the North Carolina Cooperative Extension Service.

Access Roads

Lloyd W. Swift, Jr., research forester, U.S. Forest Service, and Lane Price, district conservationist, and Howard Tew, area engineer, Natural Resources Conservation Service, helped prepare this section.

Establishing access roads in Jackson County has always been a problem, and many abandoned roads scar the slopes and valley bottoms. Sometimes a new

road follows the path of an old one, repeating the errors of the past rather than taking advantage of new technology and experience. Currently, the construction of roads is at an unprecedented level in the mountains. Old roads are reopened by landowners to provide access to woodlots and intermittent farmland. Both old and new roads are opened or built each year for logging on private and government lands. But the largest road construction effort is to give access to second homes and real estate developments. In all of these situations, the common need is for a low-cost, non-polluting, and essentially self-maintaining road design. The trend is away from building, using, and then abandoning a road to building, using, and retaining most roads in a low or intermittent service category.

The U.S. Forest Service has supported research and demonstrations on forest access road design for more than 50 years at the Coweeta Hydrologic Laboratory in the Nantahala Mountains in Macon County. Early work demonstrated methods of stabilization of roadbanks using brush and native grasses or weeds. Through a series of logging demonstrations, a minimum standard intermittent-use road design was developed and tested. Features of this design are:

1. All of the exposed soil is revegetated as construction progresses.
2. Exposure of bare soils is minimized by making vertical cuts and by reducing the width of the roadbed by eliminating the inside ditchline.
3. Soils and geology are identified on maps and construction practices are modified on unstable sites.
4. Siltation of permanent and intermittent streams is minimized by keeping a filter strip of undisturbed soil between the road and stream channel and by crossing channels at right angles, always using bridges, open pipe, or stream crossing fords that have geotextile and gravel.
5. Forest vegetation and brush is cut from the right-of-way and piled below the roadway before construction begins. This brush barrier intercepts sediment-laden storm water or slows its progress downslope.
6. A covering is laid on loose soil in fills to control erosion at critical points, such as stream crossings and dip outlets. Excelsior and burlap sheets or scattered branches, brush, cut weeds, or grasses help to protect the soil until new grass can be established.
7. Surface water is removed from the roadbed by outsloping and broad-based dips. Inside ditchlines are used only when necessary to intercept subsurface flow out of the cutbank. Ditchlines that carry storm water tend to undermine the cutbank, become gullies, and require maintenance.
8. Broad-based dips are short sections of reverse grade that intercept storm water and divert it off the roadbed. Dips are spaced about 200 feet apart and placed to divert water away from stream crossings or steep grades.
9. The maximum grade is held to 8 percent, whenever possible.
10. In areas where gravel is not used on the roadbeds, grass is planted on the entire roadway. Traffic may kill some of the grass, but the rest of the roadbed remains protected from erosion. Gravel is used on the steeper grades, on problem soils, or on heavily travelled sections. Large washed rocks that have a nominal diameter of 3 inches provide an effective pavement to control erosion on less travelled roads. Gravel bonds best to the roadbed if it is placed immediately after construction when the soil is loose.
11. Maintenance requirements for access roads are increased by traffic in winter and early spring, when the soils are wet and soft. Where traffic can be controlled, the only maintenance that is needed is mowing grass and brush annually, supplemented by periodic cleaning of dip outlets. Heavier traffic may require smoothing the roadbed every 5 to 10 years and replacing grass and gravel. Heavy year-round traffic requires that a road be upgraded and receive scheduled maintenance.

Not every user follows these practices. Nevertheless, the road design developed and tested at the Coweeta Hydrologic Laboratory has influenced Federal, State, and forest industry guidelines and has contributed to controlling erosion on access roads and minimizing the impact of sedimentation on landowners who are downslope and on mountain streams. The U.S. Forest Service incorporates features of the design in timber sale contracts and road construction specifications. Elements of the design also appear in North Carolina's Best Management Practice guidelines for reducing nonpoint source pollution. Attachments to the example timber sale contract provided by the North Carolina Forest Service for private landowners and consulting foresters include many of these access road guidelines.

Forest industries early recognized and adopted the concept that a low-cost, intermittent-use road is a permanent and sound economic investment, and they moved away from the cycle of building and rebuilding temporary roads. In 1985, the Soil Conservation Service published a booklet titled "The Layman's Guide to Private Access Road Construction in the Southern Appalachian Mountains." This booklet expands on the approach described here to help homebuilders and developers build usable access roads with minimal environmental impact and cost.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields,

sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. The animal waste lagoons commonly used in farming operations are not considered in the ratings. They are generally deeper than the lagoons referred to in the table and rely on anaerobic bacteria to decompose waste materials.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope or bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, depth to a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, and soil reaction affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult

to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* have more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. These soils have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale, siltstone, and weathered granite saprolite, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20

to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area. Ponds that are less than about 2 acres in size are not shown on the soil maps because of the scale of mapping.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or mica. Depth to a high water table affects the amount of usable material. It also affects trafficability.

Soils that have a high content of mica, such as Cashiers, Chandler, and Fannin soils, are poorly suited to the construction of embankments. The problems resulting from the high content of mica include difficulty in compaction, poor trafficability, susceptibility to erosion, and low shear strength. Also, piping commonly is a problem if the soil material is used to impound water.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement, permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, depth to layers of sand, gravel, and cobbles, slope, susceptibility to flooding, and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, the type of bedrock, large stones, slope, and the hazard of cutbanks caving. Availability of drainage outlets is not considered in the ratings but is a problem on many of the flood plain soils in the county.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the availability of suitable irrigation water, the depth of the root zone, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to help control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. Maintenance of terraces and diversions is adversely affected by a restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability.

Grassed waterways are natural or constructed

channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as very high levels of magnesium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed *(16)*. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 17.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages, by weight, of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, by volume, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 17.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-

weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the ability of the soil to adsorb cations, moisture retention, the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time. It is the difference between the amount of soil water at field moisture capacity and the amount at wilting point.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE)

to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep or very deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep to very deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil listed in table 16 is assigned to two hydrologic groups, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams or by runoff from adjacent slopes. Shallow water standing

or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely strata of water-worn, rounded gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Data on flooding recorded at the TVA Gaging Stations in the period 1927 to 1972 were used to help assign the frequency of flooding to soils in Jackson County. Information on the extent of flooding based only on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table, the kind of water table, and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16. An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft, weathered, or hard. If the rock is soft, weathered, or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 17 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the North Carolina Department of Transportation and Highway Safety, Materials and Test Unit, Raleigh, North Carolina.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(20)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol.* An example is Inceptisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Umbrept (*Umbr*, meaning shade, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplumbrepts (*Hapl*, meaning minimal horizonation, plus *umbrepts*, the suborder of the Inceptisols that has an umbric epipedon).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplumbrepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Typic Haplumbrepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The location of the typical pedon is described, and coordinates generally are identified by the State plane grid system or by longitude and latitude. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(21)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(20)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Balsam Series

These soils are very deep, well drained, and moderately rapidly permeable. They formed in colluvium derived from materials weathered from high-grade

metamorphic rocks. They are in coves and gaps. Elevation is generally above 4,800 feet. Slope ranges from 8 to 50 percent. The soils are classified as loamy-skeletal, mixed, frigid Typic Haplumbrepts.

Balsam soils are geographically associated with Tanasee soils. Tanasee soils are coarse-loamy. They are intermingled with areas of the Balsam soils in coves and gaps and generally are in the smoother areas between drainageways.

Typical pedon of Balsam sandy loam, in an area of Tanasee-Balsam complex, 15 to 30 percent slopes, stony; 10 miles northeast of Cullowhee, 1,000 feet northwest of the Richland Balsam Exhibit parking lot on the Blue Ridge Parkway, near the headwaters of Beech Flat Creek Watershed in a stand of red spruce and dead Fraser fir (State plane coordinates 800,000 feet N., 630,000 feet E.):

Oe—2 inches to 0; partly decomposed leaves, twigs, roots, and other coniferous plant material.

A1—0 to 4 inches; black (10YR 2/1) sandy loam; very dark brown (10YR 2/2) dry; weak fine granular structure; very friable; many fine to coarse roots; 20 percent, by volume, rock fragments, mainly stones; few fine flakes of mica; 18 percent organic matter; very strongly acid; clear wavy boundary.

A2—4 to 13 inches; very dark brown (10YR 2/2) sandy loam; weak fine granular structure; very friable; common fine to coarse roots; 20 percent, by volume, rock fragments, mainly stones; few fine flakes of mica; 10 percent organic matter; very strongly acid; clear wavy boundary.

Bw1—13 to 22 inches; dark yellowish brown (10YR 4/4) very cobbly loam; weak medium subangular blocky structure; very friable; common fine to coarse roots; 40 percent, by volume, rock fragments, mainly cobbles; common fine flakes of mica; very strongly acid; gradual wavy boundary.

Bw2—22 to 48 inches; dark yellowish brown (10YR 4/6) very cobbly fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; 50 percent, by volume, rock fragments, mainly cobbles; common fine flakes of mica; very strongly acid; gradual irregular boundary.

C—48 to 65 inches; dark yellowish brown (10YR 4/6), black (10YR 2/1), and white (10YR 8/2) very cobbly sandy loam; massive; very friable; few fine roots; 55 percent, by volume, rock fragments, mainly cobbles; common fine and medium flakes of mica; common manganese coatings on rock fragments; very strongly acid.

The thickness of the solum ranges from 40 to 72 inches. The depth to bedrock is more than 72 inches. Reaction ranges from extremely acid to moderately acid. The number of mica flakes is few or common. The average content of rock fragments, by volume, in the particle-size control section ranges from 35 to 80 percent. The rock fragments range from gravel to boulders in size. Typically, the amount of rock fragments increases with depth. The content of rock fragments typically is more than 50 percent in the C horizon.

The A horizon has hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 3.

A thin AB horizon occurs in some pedons. It has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. Value and chroma are not both less than 3.5 in the same horizon. The horizon is fine sandy loam, sandy loam, or loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is fine sandy loam, sandy loam, or loam in the fine-earth fraction.

The BC horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is fine sandy loam, sandy loam, coarse sandy loam, or loam in the fine-earth fraction.

The C horizon, if it occurs, is colluvium that varies in color and is fine sandy loam, sandy loam, coarse sandy loam, loamy sand, or loamy coarse sand in the fine-earth fraction.

Biltmore Series

These soils are very deep, well drained or moderately well drained, and rapidly permeable. They formed in sandy recent alluvium. They are on flood plains along large streams. Elevation generally ranges from 1,850 to 2,500 feet. Slope ranges from 0 to 3 percent. The soils are classified as mixed, mesic Typic Udipsamments.

Biltmore soils are geographically associated with Rosman and Statler soils. Rosman soils are coarse-loamy and are in long strips behind the Biltmore soils on the flood plain. Statler soils are fine-loamy. They are on slightly elevated low stream terraces.

Typical pedon of Biltmore sand, 0 to 3 percent slopes, frequently flooded; about 1.1 miles southwest of the intersection of U.S. Highway 441 and the Tuckasegee River at Whittier, 50 feet south of the river, in a strawberry field (State plane coordinates 640,000 feet N., 710,000 feet E.):

Ap—0 to 10 inches; dark brown (10YR 4/3) sand; weak fine granular structure; very friable; common fine and medium roots; few fine flakes of mica; slightly acid; clear smooth boundary.

C1—10 to 27 inches; dark yellowish brown (10YR 4/6) sand; single grained; loose; few fine and medium

roots; common medium flakes of mica; slightly acid; gradual wavy boundary.

C2—27 to 36 inches; yellowish brown (10YR 5/8) loamy sand; single grained; loose; few fine roots; common medium flakes of mica; slightly acid; gradual wavy boundary.

C3—36 to 60 inches; dark yellowish brown (10YR 4/4) sand; single grained; loose; common medium flakes of mica; slightly acid.

The sandy sediment is 40 to 60 inches or more deep over deposits of cobbles and gravel that are stratified with sandy or loamy material. Reaction is strongly acid to slightly acid in unlimed areas. The number of mica flakes is few or common. The content of rock fragments is as much as 10 percent, by volume, to a depth of 40 inches but may be more than 35 percent below a depth of 40 inches.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 1 to 6. Where value is 3 and chroma is 1 to 3, the horizon is less than 10 inches thick.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. Mottles with chroma of 2 or less are few or common in some pedons at a depth of 20 to 40 inches. The horizon is dominantly sand, loamy sand, or loamy fine sand. In some pedons, however, it has thin strata of sandy loam or loam less than 6 inches thick.

Braddock Series

These soils are very deep, well drained, and moderately permeable. They formed in old alluvium and colluvium. They are on high stream terraces or colluvial fans. Elevation generally ranges from 1,900 to 2,500 feet. Slope ranges from 2 to 30 percent. The soils are classified as clayey, mixed, mesic Typic Hapludults.

Braddock soils are geographically associated with Dillsboro soils, which are Humic Hapludults and are in slight depressions.

Typical pedon of Braddock clay loam, 2 to 8 percent slopes, eroded; about 350 feet west of the intersection of U.S. Highway 441 and Secondary Road 1406, about 500 feet north of Secondary Road 1406 (State plane coordinates 646,000 feet N., 717,000 feet E.):

Ap—0 to 8 inches; reddish brown (5YR 4/4) clay loam; weak medium granular structure; friable; many fine roots; few fine flakes of mica; 5 percent gravel, by volume; neutral; clear smooth boundary.

Bt1—8 to 18 inches; red (2.5YR 4/8) clay; moderate fine and medium subangular blocky structure; firm, sticky and slightly plastic; common discontinuous clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—18 to 36 inches; red (2.5YR 4/8) clay; few fine distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and slightly plastic; common discontinuous clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—36 to 52 inches; red (2.5YR 5/8) clay; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and slightly plastic; common discontinuous clay films on faces of peds; few fine flakes of mica; few manganese stains; strongly acid; gradual wavy boundary.

BC—52 to 60 inches; mottled red (2.5YR 5/8), yellowish red (5YR 5/8), and strong brown (7.5YR 5/8) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine flakes of mica; common manganese stains; strongly acid.

The thickness of the solum ranges from 40 to 60 inches or more. The depth to hard bedrock is more than 60 inches. Reaction is very strongly acid or strongly acid. In limed areas, the upper part of the soil ranges from moderately acid to neutral. The content of water-rounded pebbles and cobbles ranges from 0 to 15 percent, by volume, in the Ap, Bt, BC, and C horizons. The 2C horizon, if it occurs, has 35 to 60 percent, by volume, rock fragments. The number of mica flakes is few or common.

The Ap or A horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6.

The Bt horizon has hue of 10R or 2.5YR, value of 3 to 5, and chroma of 6 to 8. Mottles in shades of yellow or brown range from none to common. The horizon is clay loam or clay.

The BC horizon, if it occurs, has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 6 to 8. Many pedons are mottled or streaked in shades of red, yellow, or brown. The horizon is loam, sandy clay loam, or clay loam.

Some pedons have a C horizon. This horizon is multicolored alluvium or colluvium. It is sandy loam, fine sandy loam, or loam.

Some pedons have a 2C horizon. This horizon is similar in color and texture to the C horizon. It has 35 to 60 percent, by volume, rock fragments.

Brasstown Series

These soils are deep, well drained, and moderately permeable. They formed in saprolite weathered from metasedimentary rocks. They generally are on

ridgetops and south- to west-facing side slopes. Elevation generally ranges from 1,900 to 3,500 feet. Slope ranges from 15 to 50 percent. The soils are classified as fine-loamy, mixed, mesic Typic Hapludults.

Brasstown soils are geographically associated with Junaluska and Tsali soils. Junaluska soils are moderately deep to weathered bedrock and are intermingled with areas of the Brasstown soils. Tsali soils are shallow to weathered bedrock and are on narrow ridgetops or in areas along stream gorges.

Typical pedon of Brasstown channery fine sandy loam, in an area of Junaluska-Brasstown complex, 30 to 50 percent slopes; about 0.4 mile northeast of Wilmot on Cane Branch, 0.3 mile north of the intersection of Cane Branch and U.S. Highway 441 (State plane coordinates 631,800 feet N., 717,000 feet E.):

Oi—1 inch to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A—0 to 4 inches; dark brown (10YR 4/3) channery fine sandy loam; weak fine granular structure; very friable; common fine to coarse roots; 20 percent, by volume, channers; common fine flakes of mica; strongly acid; clear wavy boundary.

Bt1—4 to 24 inches; yellowish red (5YR 5/6) channery sandy clay loam; weak fine and medium subangular blocky structure; friable; common fine to coarse roots; few discontinuous clay films on faces of peds; 20 percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—24 to 33 inches; yellowish red (5YR 5/8) channery sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; few discontinuous clay films on faces of peds; 25 percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—33 to 45 inches; red (2.5YR 5/8) channery clay loam; moderate fine and medium subangular blocky structure; friable; few fine and medium roots; few discontinuous clay films on faces of peds; 25 percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

BC—45 to 50 inches; yellowish red (5YR 5/8) channery fine sandy loam; weak fine and medium subangular blocky structure; friable; few fine and medium roots; 25 percent, by volume, channers; common fine flakes of mica; strongly acid; clear irregular boundary.

Cr—50 to 60 inches; multicolored, weathered, fractured metasandstone; few thin seams of yellowish red (5YR 5/8) fine sandy loam in rock fractures.

The thickness of the solum ranges from 30 to 59 inches. The depth to weathered bedrock ranges from 40 to 60 inches. The depth to hard bedrock is more than 60 inches. The content of rock fragments is as much as 35 percent, by volume. Reaction is very strongly acid to moderately acid in unlimed areas. The number of mica flakes is few or common.

The A horizon has hue of 10YR to 5YR, value of 3 to 5, and chroma of 3 to 8. Where value is 3 and chroma is 3 or 4, the horizon is less than 6 inches thick.

The BA horizon, if it occurs, has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is loam, fine sandy loam, or sandy clay loam in the fine-earth fraction.

The Bt horizon has a hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is loam, sandy clay loam, or clay loam in the fine-earth fraction.

The BC horizon, if it occurs, is similar in color to the Bt horizon. It is loam, fine sandy loam, silt loam, or sandy clay loam in the fine-earth fraction.

The C horizon, if it occurs, is multicolored saprolite. It is fine sandy loam, loam, or silt loam in the fine-earth fraction.

The Cr horizon is multicolored, weathered, fractured metasedimentary rock.

Burton Series

These soils are moderately deep, well drained, and moderately rapidly permeable. They formed in saprolite weathered from high-grade metamorphic rocks. They are on ridgetops, head slopes, and side slopes. Elevation is generally above 4,800 feet. Slope ranges from 8 to 95 percent. The soils are classified as coarse-loamy, mixed, frigid Typic Haplumbrepts.

Burton soils are geographically associated with Balsam, Craggey, Tanasee, and Wayah soils. Balsam and Tanasee soils are very deep and are in colluvial areas. Also, Balsam soils are loamy-skeletal. Craggey soils are shallow to hard bedrock and are in narrow, convex areas near areas of rock outcrop. Wayah soils are very deep and are in the broader and smoother areas.

Typical pedon of Burton cobbly sandy loam, in an area of Burton-Craggey-Rock outcrop complex, windswept, 8 to 30 percent slopes, stony; 250 feet southwest from the entrance to Water Rock Knob rest area on the Blue Ridge Parkway (State plane coordinates 647,000 feet N., 767,000 feet E.):

Oi—3 inches to 0; fresh red spruce and Fraser fir needles and yellow birch leaves.

A1—0 to 6 inches; very dark gray (10YR 3/1) cobbly sandy loam; weak fine granular structure; very friable; many fine to coarse roots; 15 percent, by volume, cobbles and 5 percent gravel; few fine

flakes of mica; very strongly acid; clear wavy boundary.

A2—6 to 12 inches; very dark grayish brown (10YR 3/2) cobbly sandy loam; moderate fine and medium granular structure; very friable; common fine and few medium and coarse roots; 15 percent, by volume, cobbles and 5 percent gravel; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bw—12 to 22 inches; brownish yellow (10YR 6/6) cobbly sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; 20 percent, by volume, cobbles and 5 percent gravel; common fine flakes of mica; very strongly acid; gradual wavy boundary.

Cr—22 to 36 inches; weathered, high-grade metamorphic bedrock.

R—36 inches; hard, high-grade metamorphic bedrock.

The thickness of the solum ranges from 20 to 39 inches. The depth to hard bedrock is 20 to 40 inches. The content of rock fragments ranges from 0 to 35 percent, by volume, in the control section. Reaction ranges from extremely acid to moderately acid. The number of mica flakes is few or common.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. The AB horizon, if it occurs, has hue of 10YR, value of 3 or 4, and chroma of 1 to 3.

The Bw horizon has hue of 10YR, value of 3 to 6, and chroma of 4 to 8. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The BC horizon, if it occurs, is similar in color and texture to the Bw horizon.

The C horizon, if it occurs, is similar in color to the BC horizon. It is saprolite that is commonly sandy loam or loamy sand in the fine-earth fraction.

The Cr horizon, if it occurs, is weathered, high-grade, metamorphic crystalline bedrock.

The R horizon is hard, high-grade, metamorphic bedrock.

Cashiers Series

These soils are very deep, well drained, and moderately rapidly permeable. They are on shaded mountain ridgetops and on head slopes and side slopes that have north to east aspects. They formed in saprolite weathered from high-grade, mica-rich, metamorphic rocks, such as mica gneiss or mica schist. Elevation generally ranges from 2,500 to 4,800 feet. Slope ranges from 8 to 95 percent. The soils are classified as coarse-loamy, micaceous, mesic Umbric Dystrochrepts.

Cashiers soils are geographically associated with Chandler and Fannin soils. The associated soils do not have an umbric epipedon and generally occur on south to west aspects. Also, Fannin soils are redder in color than the Cashiers soils and are fine-loamy.

Typical pedon of Cashiers gravelly fine sandy loam, 30 to 50 percent slopes; 2.2 miles west on U.S. Forest Service Road 1178 from its junction with North Carolina Highway 107, about 500 feet southeast of the road, in a wooded area (State plane coordinates 490,000 feet N., 776,000 feet E.):

Oi—3 inches to 0; partly decomposed leaves, twigs, roots, and other plant material.

A—0 to 9 inches; very dark brown (10YR 2/2) gravelly fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; 20 percent, by volume, gravel; common fine flakes of mica; strongly acid; clear wavy boundary.

Bw1—9 to 33 inches; yellowish brown (10YR 5/8) fine sandy loam; weak fine subangular blocky structure; very friable; common fine and medium roots; 5 percent, by volume, gravel; many fine flakes of mica; strongly acid; gradual wavy boundary.

Bw2—33 to 48 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak fine subangular blocky structure; very friable; few fine and medium roots; 10 percent, by volume, gravel; many fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—48 to 65 inches; dark yellowish brown (10YR 4/6) gravelly sandy loam; weak fine subangular blocky structure; very friable; 20 percent, by volume, gravel; many fine to coarse flakes of mica; very strongly acid.

The thickness of the solum ranges from 30 to 60 inches or more. The depth to hard bedrock is more than 60 inches. Reaction ranges from very strongly acid to moderately acid in unlimed areas. The content of mica flakes is common or many in the surface layer and many in the other horizons. The content of rock fragments is as much as 35 percent, by volume, in the 10- to 40-inch control section.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is loam, sandy loam, or fine sandy loam in the fine-earth fraction.

The BC horizon, if it occurs, is similar in color to the Bw horizon. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The C horizon, if it occurs, is multicolored saprolite weathered from high-grade metamorphic rocks, such as mica gneiss and mica schist. It is loamy sand, loamy fine sand, sandy loam, or fine sandy loam in the fine earth-fraction.

Chandler Series

These soils are very deep, somewhat excessively drained, and moderately rapidly permeable. They are on ridgetops and side slopes that have south to west aspects. They formed in saprolite weathered from high-grade, mica-rich, metamorphic rocks, such as mica gneiss or mica schist. Elevation generally ranges from 2,500 to 4,800 feet. Slope ranges from 8 to 95 percent. The soils are classified as coarse-loamy, micaceous, mesic Typic Dystrochrepts.

Chandler soils are geographically associated with Cashiers and Fannin soils. Cashiers soils have an umbric epipedon and are generally on north- to east-facing side slopes. Fannin soils are redder in color than the Chandler soils. They have an argillic horizon and are fine-loamy. They generally occur on spur ridges and in the smoother areas of side slopes.

Typical pedon of Chandler gravelly fine sandy loam, 8 to 15 percent slopes; about 1.8 miles northwest of U.S. Highway 64 and Lupton Lake, 0.75 mile northwest of Zacharys Gap, on Big Ridge Quadrangle (State plane coordinates 534,000 feet N., 778,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous and coniferous plant material.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) gravelly fine sandy loam; weak fine and medium granular structure; very friable; many fine roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; common fine and medium flakes of mica; strongly acid; clear wavy boundary.

A2—4 to 7 inches; dark yellowish brown (10YR 4/4) gravelly fine sandy loam; moderate fine granular structure; very friable; common fine roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; many fine and medium flakes of mica; strongly acid; clear wavy boundary.

Bw1—7 to 20 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable; common fine roots; 5 percent, by volume, gravel; many fine and medium flakes of mica; very strongly acid; gradual wavy boundary.

Bw2—20 to 25 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable; few fine roots; 10 percent, by volume, gravel; many fine and medium flakes of mica; very strongly acid; gradual wavy boundary.

C—25 to 99 inches; multicolored, micaceous fine sandy loam that weathered from saprolite; massive; very friable; few fine roots; 10 percent, by volume, gravel; many fine to coarse flakes of mica; very strongly acid.

The thickness of the solum is 20 to 40 inches. The depth to hard bedrock is more than 72 inches. Reaction is very strongly acid to moderately acid in unlimed areas. The number of mica flakes ranges from few to many in the surface layer and is many in the other horizons. The content of rock fragments ranges from 15 to 35 percent, by volume, in the A horizon and is as much as 35 percent in the Bw and C horizons.

The A or Ap horizon has hue of 10YR or 7.5YR, value of 2 to 5, and chroma of 0 to 4. Where value and chroma are 3 or less, the horizon is less than 7 inches thick.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The C horizon is multicolored, micaceous saprolite. It is loam, sandy loam, or fine sandy loam in the fine-earth fraction.

Cheoah Series

These soils are deep, well drained, and moderately rapidly permeable. They formed in saprolite weathered from metasedimentary rocks. They generally are on north- to east-facing side slopes. Elevation generally ranges from 3,500 to 4,800 feet. Slope ranges from 30 to 95 percent. The soils are classified as coarse-loamy, mixed, mesic Typic Haplumbrepts.

Cheoah soils are geographically associated with Soco and Stecoah soils. The associated soils have an ochric epipedon and generally occur on south- to west-facing side slopes. Also, Soco soils are moderately deep to weathered bedrock.

Typical pedon of Cheoah channery loam, 50 to 95 percent slopes; 250 feet northwest of the north entrance to Big Witch Tunnel on the Blue Ridge Parkway (State plane coordinates 671,000 feet N., 746,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A—0 to 11 inches; very dark grayish brown (10YR 3/2) channery loam; weak fine granular structure; very friable; many fine to coarse roots; 15 percent, by volume, channers and 5 percent, by volume, flagstones; few fine flakes of mica; very strongly acid; clear smooth boundary.

AB—11 to 15 inches; dark yellowish brown (10YR 4/4) channery loam; weak medium granular structure; very friable; common fine to coarse roots; 15 percent, by volume, channers and 5 percent, by volume, flagstones; few fine and medium flakes of mica; very strongly acid; clear wavy boundary.

Bw1—15 to 22 inches; yellowish brown (10YR 5/8) channery loam; weak medium subangular blocky structure; friable; few fine and medium roots; 20

percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bw2—22 to 32 inches; strong brown (7.5YR 5/6) channery loam; weak medium subangular blocky structure; friable; few fine and medium roots; 20 percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

BC—32 to 39 inches; strong brown (7.5YR 5/6) channery fine sandy loam; weak medium subangular blocky structure; friable; few medium roots; 25 percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

C—39 to 56 inches; multicolored channery fine sandy loam that weathered from saprolite; massive; very friable; 25 percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

Cr—56 to 60 inches; multicolored, weathered, interbedded metasandstone and phyllite; massive; black (10YR 2/1) manganese coatings along fractures.

The thickness of the solum ranges from 30 to 59 inches. The depth to weathered, fractured bedrock is 40 to 60 inches. The depth to hard bedrock is more than 60 inches. Reaction ranges from extremely acid to strongly acid in the A horizon and from very strongly acid to moderately acid in the other horizons. The number of mica flakes is few or common. The content of rock fragments ranges from 5 to 35 percent, by volume, in the 10- to 40-inch control section.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3.

Some pedons have a thin AB horizon. This horizon has hue of 10YR and value and chroma of 3 or 4. It is fine sandy loam or loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is sandy loam, fine sandy loam, loam, or silt loam in the fine earth-fraction.

The BC horizon, if it occurs, is similar in color and texture to the Bw horizon.

The C horizon, if it occurs, is multicolored saprolite weathered from metasedimentary rocks, such as thinly bedded sandstone and phyllite. It is sandy loam, fine sandy loam, or silt loam in the fine-earth fraction.

The Cr horizon is multicolored, weathered metasandstone and phyllite.

Chestnut Series

These soils are moderately deep, well drained, and moderately rapidly permeable. They formed in saprolite weathered from high-grade metamorphic rocks. They generally are on ridgetops and south- to west-facing side slopes. Elevation generally ranges from 3,500 to 4,800 feet. Slope ranges from 8 to 95 percent. The soils are classified as coarse-loamy, mixed, mesic Typic Dystrochrepts.

Chestnut soils are geographically associated with Edneyville, Plott, and Cleveland soils. Edneyville and Plott soils are very deep to weathered bedrock and are on the smoother parts of the landscape. Also, Plott soils are on north- to east-facing slopes and have an umbric epipedon. Cleveland soils are loamy and shallow to hard bedrock. They occur near areas of rock outcrop.

Typical pedon of Chestnut gravelly fine sandy loam, in an area of Edneyville-Chestnut complex, 30 to 50 percent slopes, stony; about 4.3 miles east of the intersection of North Carolina Highway 281 and Secondary Road 1760, about 0.6 mile south of Secondary Road 1760 on Charlie Creek Road, 500 feet south of the dam on Meade Lake (State plane coordinates 574,100 feet N., 811,350 feet E.):

Oi—1 inch to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A—0 to 3 inches; dark yellowish brown (10YR 4/4) gravelly fine sandy loam; weak fine granular structure; very friable; common fine roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bw—3 to 15 inches; strong brown (7.5YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; 5 percent, by volume, gravel; common fine and medium flakes of mica; very strongly acid; gradual wavy boundary.

C—15 to 28 inches; strong brown (7.5YR 5/6) gravelly sandy loam that weathered from saprolite; streaks of white (10YR 8/2) feldspar and black (10YR 2/1) manganese on faces of peds; massive; very friable; few fine roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; common fine and medium flakes of mica; very strongly acid; gradual wavy boundary.

Cr—28 to 60 inches; multicolored, weathered gneiss bedrock.

The thickness of the solum ranges from 15 to 39 inches. The depth to weathered, high-grade metamorphic crystalline bedrock is 20 to 40 inches. The depth to hard bedrock is more than 40 inches. Reaction is very strongly acid to moderately acid in unlimed areas. The number of mica flakes is few or common. The content of rock fragments ranges from 0 to 35 percent, by volume, in the 10- to 40-inch control section.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 1 to 6. Where value is 2 or 3

and chroma is 1 to 3, the horizon is less than 7 inches thick.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6 and chroma of 3 to 8. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The C horizon, if it occurs, is strong brown or multicolored saprolite weathered from high-grade metamorphic rocks. It is loamy sand, sandy loam, or fine sandy loam in the fine earth-fraction.

The Cr horizon is multicolored, weathered, high-grade metamorphic rock, such as mica gneiss or hornblende gneiss.

Cleveland Series

These soils are shallow, somewhat excessively drained, and moderately rapidly permeable. They formed in saprolite weathered from high-grade metamorphic rocks. They are on ridgetops, head slopes, and side slopes. Elevation generally ranges from 2,500 to 4,800 feet. Slope ranges from 15 to 95 percent. The soils are classified as loamy, mixed, mesic Lithic Dystrochrepts.

Cleveland soils are geographically associated with Chestnut soils and areas of rock outcrop. Chestnut soils are moderately deep and are in concave areas and on the lower slopes. Areas of rock outcrop occur on cliffs or head slopes and are commonly adjacent to the Cleveland soils.

Typical pedon of Cleveland sandy loam, in an area of Cleveland-Chestnut-Rock outcrop complex, windswept, 15 to 30 percent slopes; about 1.0 mile southeast of Cowee Gap, 2.7 miles northeast of Bearpen Mountain, 0.25 mile southwest of the top of Whiteside Mountain, 1,500 feet east of the Macon County line (State plane coordinates 512,400 feet N., 764,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A—0 to 5 inches; black (10YR 2/1) sandy loam; weak fine and medium granular structure; very friable; many fine to coarse roots; 5 percent, by volume, gravel and 5 percent, by volume, cobbles; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bw—5 to 17 inches; yellowish brown (10YR 5/8) loam; weak medium subangular blocky structure; very friable; common fine to coarse roots; 10 percent, by volume, gravel; few fine flakes of mica; strongly acid; abrupt wavy boundary.

R—17 inches; hard granodiorite bedrock.

The thickness of the solum ranges from 10 to 19 inches. The depth to hard, high-grade metamorphic bedrock is 10 to 20 inches. Reaction ranges from very strongly acid to moderately acid. The number of mica flakes is few or common. The content of rock fragments ranges from 0 to 35 percent, by volume.

The A horizon has hue of 10YR or 7.5YR, value of 2 to 5, and chroma of 1 to 4. Where value is 2 or 3 and chroma is 1 to 3, the horizon is less than 7 inches thick.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The R horizon is high-grade metamorphic bedrock.

Cowee Series

These soils are moderately deep, well drained, and moderately permeable. They formed in saprolite weathered from high-grade metamorphic rocks. They are generally on ridgetops and south- to west-facing side slopes. Elevation generally ranges from 2,000 to 3,500 feet. Slope ranges from 8 to 95 percent. The soils are classified as fine-loamy, mixed, mesic Typic Hapludults.

Cowee soils are geographically associated with Evard and Trimont soils. The associated soils are very deep to weathered bedrock. Trimont soils have a darker surface layer than that of the Cowee soils and are generally on north- to east-facing side slopes. Evard soils are intermingled with areas of the Cowee soils.

Typical pedon of Cowee gravelly sandy loam, in an area of Evard-Cowee complex, 15 to 30 percent slopes; about 1.1 miles northeast of Cullowhee from the Tuckasegee River on Secondary Road 1002, about 0.8 mile north of Black Mountain Church, 0.2 mile north on a U.S. Forest Service access road and 250 feet west on a U.S. Forest Service trail, 25 feet north of the trail (State plane coordinates 609,000 feet N., 768,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A—0 to 5 inches; reddish brown (5YR 4/4) gravelly sandy loam; weak fine granular structure; very friable; many fine and medium roots; 20 percent, by volume, gneiss gravel; common fine and medium flakes of mica; strongly acid; clear wavy boundary.

Bt1—5 to 13 inches; red (2.5YR 4/8) gravelly sandy loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; common faint clay films on faces of peds; 20 percent, by volume, gneiss gravel; common fine and medium flakes of mica; strongly acid; gradual wavy boundary.

Bt2—13 to 27 inches; red (2.5YR 5/8) gravelly sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common faint clay films on faces of

peds; 30 percent, by volume, gneiss gravel; common fine and medium flakes of mica; strongly acid; abrupt wavy boundary.

Cr—27 to 60 inches; multicolored, weathered hornblende gneiss; partly consolidated but can be dug with difficulty by a spade.

The thickness of the solum is 20 to 39 inches. The depth to weathered bedrock is 20 to 40 inches, and the depth to hard bedrock is more than 40 inches. Reaction is very strongly acid to moderately acid in unlimed areas. The number of mica flakes is few or common. The content of rock fragments ranges from 0 to 35 percent, by volume.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 8. Where value is 3 and chroma is 3 or 4, the horizon is less than 6 inches thick.

Some pedons have a BA horizon. This horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam, loam, sandy clay loam, or clay loam in the fine-earth fraction.

The BC horizon, if it occurs, is similar in color to the Bt horizon. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The C horizon, if it occurs, is similar in color to the BC horizon or is multicolored. In the fine-earth fraction, it is sandy loam, fine sandy loam, or loam that weathered from saprolite.

The Cr horizon is multicolored, weathered, high-grade metamorphic bedrock. It is partly consolidated but can be dug with difficulty by a spade.

Craggey Series

These soils are shallow, somewhat excessively drained, and moderately rapidly permeable. They formed in saprolite weathered from high-grade metamorphic rocks. They are on ridgetops, head slopes, and side slopes. Elevation is generally above 4,800 feet. Slope ranges from 15 to 95 percent. The soils are classified as loamy, mixed, frigid Lithic Haplumbrepts.

Craggey soils are geographically associated with Burton and Wayah soils. Burton soils are moderately deep to hard bedrock and are intermingled with areas of the Craggey soils. Wayah soils are very deep to hard bedrock and are in the smoother areas away from areas of rock outcrop.

Typical pedon of Craggey cobbly sandy loam, in an area of Burton-Craggey-Rock outcrop complex, windswept, 30 to 95 percent slopes, stony; 300 feet north of Water Rock Knob rest area on the Blue Ridge Parkway near the Jackson-Haywood County line (State plane coordinates 649,000 feet N., 768,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous and coniferous plant material.

A1—0 to 6 inches; black (10YR 2/1) cobbly sandy loam; weak fine and medium granular structure; very friable; many fine to coarse roots; 15 percent, by volume, cobbles, 5 percent, by volume, gravel, and 5 percent, by volume, stones; common fine flakes of mica; very strongly acid; clear smooth boundary.

A2—6 to 12 inches; very dark gray (10YR 3/1) cobbly sandy loam; weak fine and medium granular structure; very friable; common fine and few medium and coarse roots; 15 percent, by volume, cobbles, 5 percent, by volume, gravel, and 5 percent, by volume, stones; few fine flakes of mica; strongly acid; clear wavy boundary.

A3—12 to 16 inches; dark brown (10YR 3/3) cobbly sandy loam; weak medium granular structure; very friable; few medium and coarse roots; 15 percent, by volume, cobbles and 5 percent, by volume, stones; few fine flakes of mica; strongly acid; abrupt wavy boundary.

R—16 inches; hard hornblende gneiss bedrock.

The thickness of the solum ranges from 10 to 19 inches. The depth to hard, high-grade metamorphic bedrock is 10 to 20 inches. Reaction ranges from extremely acid to moderately acid. The number of mica flakes is few or common. The content of rock fragments is as much as 35 percent, by volume.

The A horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3.

The R horizon is hard, high-grade metamorphic bedrock.

Cullasaja Series

These soils are very deep, well drained, and moderately rapidly permeable. They formed in colluvium derived from high-grade metamorphic rocks. They are on toe slopes and benches and along drainageways in coves. Elevation generally ranges from 3,500 to 4,800 feet. Slope ranges from 8 to 90 percent. The soils are classified as loamy-skeletal, mixed, mesic Typic Haplumbrepts.

Cullasaja soils are geographically associated with Tuckasegee soils, which are fine-loamy and are intermingled with areas of the Cullasaja soils in coves and on benches and toe slopes.

Typical pedon of Cullasaja very cobbly fine sandy loam, in an area of Cullasaja-Tuckasegee complex, 15 to 30 percent slopes, stony; about 3.5 miles northwest

of the intersection of U.S. Highway 64 and North Carolina Highway 107 in Cashiers, 1.8 miles west on Secondary Road 1152 from its intersection with Secondary Road 1149, about 0.25 mile west on a logging road (State plane coordinates 544,300 feet N., 745,300 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A1—0 to 5 inches; black (10YR 2/1) very cobbly fine sandy loam; weak medium granular structure; very friable; many fine to coarse roots; 15 percent, by volume, gravel, 30 percent, by volume, cobbles, and 5 percent, by volume, stones; few fine flakes of mica; very strongly acid; clear smooth boundary.

A2—5 to 13 inches; very dark brown (10YR 2/2) very cobbly fine sandy loam; weak medium granular structure; very friable; many fine to coarse roots; 15 percent, by volume, gravel, 30 percent, by volume, cobbles, and 5 percent, by volume, stones; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bw1—13 to 26 inches; dark yellowish brown (10YR 4/4) very cobbly fine sandy loam; weak fine and medium subangular blocky structure; very friable; common medium to coarse roots; 10 percent, by volume, gravel, 30 percent, by volume, cobbles, and 15 percent, by volume, stones; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bw2—26 to 38 inches; yellowish brown (10YR 5/6) very cobbly sandy loam; weak medium subangular blocky structure; very friable; few fine roots; 10 percent, by volume, gravel, 30 percent, by volume, cobbles, and 15 percent, by volume, stones; few fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—38 to 60 inches; dark yellowish brown (10YR 4/6) extremely cobbly sandy loam; weak fine subangular blocky structure; very friable; few medium and coarse roots; 15 percent, by volume, gravel, 30 percent, by volume, cobbles, and 20 percent, by volume, stones; few fine flakes of mica; very strongly acid.

The thickness of the solum ranges 30 to more than 60 inches. The depth to hard bedrock is more than 72 inches. Reaction ranges from very strongly acid to slightly acid in the A horizon in unlimed areas. It ranges from very strongly acid to moderately acid in the Bw horizon and the lower horizons. The number of mica flakes is few or common. The content of rock fragments ranges from 35 to 80 percent, by volume, and from gravel to boulders in size in the control section.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is sandy loam, fine sandy loam, loam, or sandy clay loam in the fine-earth fraction.

The BC horizon, if it occurs, has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 4 to 8. It is sandy loam, coarse sandy loam, loamy fine sand, or loamy sand in the fine-earth fraction.

The C horizon, if it occurs, is colluvium that is multicolored or similar in color to the BC horizon. It is sandy loam, coarse sandy loam, loamy fine sand, loamy sand, or loamy coarse sand in the fine-earth fraction.

Cullowhee Series

These soils are moderately deep to strata of sand, gravel, and cobbles and very deep to bedrock. They are somewhat poorly drained. They are moderately rapidly permeable in the A horizon and rapidly permeable in the C horizon. They formed in recent alluvium derived from high-grade metamorphic or metasedimentary rocks. They are on narrow flood plains along small streams. Elevation generally ranges from 1,850 to 3,000 feet. Slope ranges from 0 to 2 percent. The soils are classified as coarse-loamy over sandy or sandy-skeletal, mixed, mesic Aquic Haplumbrepts.

Cullowhee soils are geographically associated with Dellwood, Nikwasi, and Reddies soils. Dellwood soils are moderately well drained and are shallow to strata of sand, gravel, or cobbles. They have more than 35 percent rock fragments in the 10- to 40-inch control section. Nikwasi soils are poorly drained or very poorly drained. They are in depressions near the uplands. Reddies soils are moderately well drained. They are in slightly elevated areas.

Typical pedon of Cullowhee fine sandy loam, 0 to 2 percent slopes, occasionally flooded; about 2 miles south on Secondary Road 1001 from its intersection with North Carolina Highway 107, northwest on a farm path just before crossing Cullowhee Creek, 50 feet north of the path, in a hay field (State plane coordinates 638,000 feet N., 704,000 feet E.):

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; common fine flakes of mica; moderately acid; clear wavy boundary.

A—8 to 13 inches; dark brown (10YR 3/3) fine sandy loam; common medium faint dark brown (7.5YR 3/4) mottles; moderate fine granular structure; very friable; common fine and medium roots; common fine flakes of mica; few thin lenses of loamy sand; moderately acid; clear wavy boundary.

AC—13 to 19 inches; dark yellowish brown (10YR 3/4)

loamy sand; few fine distinct strong brown (7.5YR 5/6) mottles; massive; very friable; common fine flakes of mica; few manganese concretions; moderately acid; clear wavy boundary.

C—19 to 23 inches; dark yellowish brown (10YR 4/4) loamy sand; common medium distinct strong brown (7.5YR 5/6) and grayish brown (10YR 5/2) mottles; massive; very friable; common fine flakes of mica; few manganese concretions; moderately acid; clear wavy boundary.

Ab—23 to 35 inches; black (10YR 2/1) loamy fine sand; few medium prominent yellowish red (5YR 4/6) and common medium distinct grayish brown (10YR 5/2) mottles; massive; very friable; common fine flakes of mica; moderately acid; clear wavy boundary.

C′—35 to 65 inches; multicolored extremely gravelly sand; single grained; loose; 70 percent, by volume, dominantly waterworn gravel and many cobbles; common fine flakes of mica; slightly acid.

The thickness of the solum ranges from 15 to 35 inches. A sandy C horizon that contains more than 35 percent, by volume, rock fragments is within a depth of 20 to 40 inches. The depth to bedrock is more than 60 inches. Reaction is very strongly acid to slightly acid. The number of mica flakes is few or common. Rock fragments, mainly gravel or cobbles, range from 0 to 15 percent, by volume, in the Ap, A, or AC horizons and from 35 to 80 percent in the lower layers.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3.

The AC horizon, if it occurs, has hue of 10YR, value of 2 or 3, and chroma of 1 to 4. It is sand, loamy fine sand, or loamy sand in the fine-earth fraction.

Most pedons have an Ab horizon. This horizon is similar in color and texture to the AC horizon.

The Bw horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. It is mottled in chroma of 2 or less within 20 inches of the surface. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction. Some pedons have a Bg horizon below a depth of 20 inches that has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. This horizon has the same textures as the Bw horizon. The Bg horizon, if it occurs, is not immediately below the umbric epipedon.

The C or C′ horizon, if it occurs, is similar in color to the Bw horizon. If it is immediately below the umbric epipedon, mottles with chroma of 2 or less are within 20 inches of the surface. Some pedons have a Cg horizon below a depth of 20 inches. The Cg horizon, if it occurs, is similar in color to the Bg horizon. The upper part of the C and Cg horizons is dominantly sand, coarse sand, loamy sand, or loamy fine sand but ranges to sandy loam, fine sandy loam, and loam. Within a depth of 20 to 40 inches, the C and Cg horizons are sand, loamy sand, coarse sand, or loamy coarse sand in the fine-earth fraction and contain more than 35 percent, by volume, rock fragments.

Dellwood Series

These soils are shallow to strata of sand, gravel, and cobbles and very deep to bedrock. They are moderately well drained. They are moderately rapidly permeable in the surface layer and very rapidly permeable in the lower layers. They formed in recent alluvium derived from high-grade metamorphic or metasedimentary rocks. They are on narrow flood plains along high-energy streams. Elevation generally ranges from 1,850 to 3,000 feet. Slope ranges from 0 to 3 percent. The soils are classified as sandy-skeletal, mixed, mesic Fluventic Haplumbrepts.

Dellwood soils are geographically associated with Cullowhee, Nikwasi, and Reddies soils. The associated soils are moderately deep to strata of sand, gravel, and cobbles. Cullowhee soils are somewhat poorly drained and are in slight depressions. Nikwasi soils are poorly drained or very poorly drained and are in depressions near the uplands. Reddies soils are in slightly elevated areas.

Typical pedon of Dellwood gravelly fine sandy loam, 0 to 3 percent slopes, occasionally flooded; about 3.25 miles north of Tuckasegee at the intersection of North Carolina Highways 107 and 281, about 0.1 mile north of Moses Creek Church, 500 feet northwest of Stephens Cemetery (State plane coordinates 592,000 feet N., 780,000 feet E.):

Ap—0 to 8 inches; dark brown (10YR 3/3) gravelly fine sandy loam; weak fine and medium granular structure; very friable; many fine and medium roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; common fine and medium flakes of mica; slightly acid; clear wavy boundary.

A—8 to 16 inches; dark brown (10YR 3/3) cobbly sandy loam; weak fine and medium granular structure; very friable; many fine and medium roots; 5 percent, by volume, gravel and 20 percent, by volume, cobbles; common fine and medium flakes of mica; moderately acid; gradual wavy boundary.

C—16 to 60 inches; strong brown (7.5YR 4/6) very cobbly loamy sand; massive; loose; 20 percent, by volume, gravel and 35 percent, by volume, cobbles; common fine and medium flakes of mica; moderately acid.

The thickness of the solum and the depth to coarse textured material that contains more than 35 percent, by volume, rounded gravel and cobbles are 10 to 20

inches. The depth to bedrock is more than 60 inches. Reaction is very strongly acid to neutral. The number of mica flakes is few or common.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 1 to 3.

The C horizon is strong brown or multicolored alluvium derived from high-grade metamorphic crystalline or metasedimentary rocks. It is loamy sand, sand, coarse sand, or loamy coarse sand in the fine-earth fraction. It averages more than 35 percent, by volume, rock fragments.

Dillard Series

These soils are very deep, moderately well drained, and moderately permeable. They formed in old alluvium. They are on stream terraces. Elevation generally ranges from 1,850 to 2,500 feet. Slope ranges from 1 to 5 percent. The soils are classified as fine-loamy, mixed, mesic Aquic Hapludults.

Dillard soils are geographically associated with Hemphill and Statler soils. Hemphill soils are fine textured and very poorly drained and are in depressions. Statler soils are well drained and are in slightly elevated areas.

Typical pedon of Dillard loam, 1 to 5 percent slopes, rarely flooded; about 2.0 miles southeast of Cherokee on U.S. Highway 441, about 1,000 feet southeast of the intersection of Secondary Road 1406 and U.S. Highway 441 (State plane coordinates 646,000 feet N., 708,000 feet E.):

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam; moderate fine and medium granular structure; very friable; common fine and medium roots; few fine flakes of mica; slightly acid; clear smooth boundary.

Bt1—9 to 20 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; few discontinuous clay films on faces of peds; few fine flakes of mica; moderately acid; gradual wavy boundary.

Bt2—20 to 30 inches; brownish yellow (10YR 6/6) loam; common medium distinct light gray (10YR 6/1) and red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable; few discontinuous clay films on faces of peds; few fine flakes of mica; moderately acid; gradual wavy boundary.

Bt3—30 to 37 inches; brownish yellow (10YR 6/6) loam; common medium distinct light gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; few discontinuous clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.

Btg—37 to 42 inches; light gray (10YR 6/1) clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; few discontinuous clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.

BCg—42 to 70 inches; light gray (10YR 7/2) clay loam; many medium distinct yellowish red (5YR 5/8) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine flakes of mica; strongly acid.

The thickness of the solum ranges from 30 to 60 inches or more. Reaction ranges from strongly acid to moderately acid in the A horizon in unlimed areas and from very strongly acid to moderately acid in the other horizons. The number of mica flakes is few or common. The content of rock fragments is less than 15 percent, by volume.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 4. Where value is 3 and chroma is 1 to 3, the horizon is less than 10 inches thick.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. The lower part of some Bt horizons has gray mottles. The horizon is loam, sandy clay loam, or clay loam in the fine-earth fraction.

The Btg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2 and is mottled in shades of brown, yellow, or red. It is clay loam, sandy clay loam, or loam in the fine-earth fraction.

The BCg horizon, if it occurs, has hue of 10YR to 5Y, value of 6 or 7, and chroma of 1 or 2 or is mottled in shades of brown, yellow, or red. It is loam, sandy clay loam, or clay loam in the fine-earth fraction.

The Cg horizon, if it occurs, is alluvium that is similar in color to the BCg horizon. It is sand, loamy sand, sandy loam, loam, sandy clay loam, or clay loam in the fine-earth fraction.

Dillsboro Series

These soils are very deep, well drained, and moderately permeable. They formed in old alluvium. They are on high stream terraces. Elevation generally ranges from 1,850 to 2,500 feet. Slope ranges from 2 to 15 percent. The soils are classified as clayey, mixed, mesic Humic Hapludults.

Dillsboro soils are geographically associated with Braddock soils, which have a red subsoil and are in eroded, convex areas of high stream terraces.

Typical pedon of Dillsboro loam, 2 to 8 percent slopes; about 1.0 mile southwest of Webster on North Carolina Highway 116, about 0.25 mile south of the

highway, in a hay field (State plane coordinates 604,000 feet N., 738,000 feet E.):

Ap—0 to 10 inches; dark reddish brown (5YR 3/3) loam; moderate medium granular structure; very friable; many fine and medium roots; few fine flakes of mica; moderately acid; clear smooth boundary.

Bt1—10 to 15 inches; yellowish red (5YR 4/6) clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; few faint clay films on faces of peds; few fine flakes of mica; slightly acid; gradual smooth boundary.

Bt2—15 to 33 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; friable; few fine and medium roots; few faint clay films on faces of peds; 4 percent, by volume, cobbles and 4 percent, by volume, gravel; few fine flakes of mica; slightly acid; diffuse smooth boundary.

Bt3—33 to 43 inches; yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; 6 percent, by volume, gravel and 5 percent, by volume, cobbles; few fine flakes of mica; strongly acid; gradual wavy boundary.

2Bt4—43 to 59 inches; strong brown (7.5YR 5/6) very cobbly clay; common fine distinct yellowish red (5YR 5/8) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; common manganese nodules; 15 percent, by volume, cobbles and 25 percent, by volume, gravel; few fine flakes of mica; strongly acid; gradual wavy boundary.

2BC—59 to 75 inches; yellowish brown (10YR 5/6) very cobbly clay loam; common medium distinct red (2.5YR 4/8) and few fine and medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; common manganese nodules; 20 percent, by volume, gravel and 15 percent, by volume, cobbles; few fine flakes of mica; strongly acid.

The thickness of the solum is more than 60 inches. The depth to bedrock is more than 72 inches. Generally, reaction ranges from very strongly acid to moderately acid in unlimed areas. In areas of the A horizon and the upper part of the Bt horizon that have been intensively cultivated and frequently limed, however, reaction is typically moderately acid to neutral. The number of mica flakes is few or common. The content of waterworn rock fragments ranges from 0 to 35 percent, by volume, in the upper 40 inches and from 0 to 60 percent, by volume, below a depth of 40 inches. The rock fragments are mainly gravel or cobbles in size.

The A or Ap horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 4.

Some pedons have a thin BA horizon. This horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam or clay loam in the fine-earth fraction.

The Bt horizon and the 2Bt horizon, if it occurs, have hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. They are clay loam or clay in the fine-earth fraction. The Bt horizon contains as much as 35 percent rock fragments. The 2Bt horizon contains 35 to 60 percent, by volume, rock fragments.

The BC and 2BC horizons, if they occur, are similar in color to the Bt and 2Bt horizons. They are loam, sandy clay loam, or clay loam in the fine-earth fraction. The BC horizon contains as much as 35 percent, by volume, rounded rock fragments. The 2BC horizon contains 35 to 60 percent, by volume, rounded rock fragments.

Some pedons have a C or 2C horizon. These horizons are loamy or sandy alluvial or colluvial material that varies in color. The content of rounded rock fragments is as much as 35 percent, by volume, in the C horizon and as much as 60 percent, by volume, in the 2C horizon.

Edneyville Series

These soils are very deep, well drained, and moderately rapidly permeable. They formed in saprolite weathered from high-grade metamorphic rocks. They generally are on ridgetops and south- to west-facing side slopes. Elevation generally ranges from 3,500 to 4,800 feet. Slope ranges from 8 to 95 percent. The soils are classified as coarse-loamy, mixed, mesic Typic Dystrochrepts.

Edneyville soils are geographically associated with Chestnut and Plott soils. Chestnut soils are moderately deep to weathered bedrock and are on the upper part of side slopes or spur ridges. Plott soils have an umbric epipedon and are generally on north- to east-facing side slopes.

Typical pedon of Edneyville gravelly fine sandy loam, in an area of Edneyville-Chestnut complex, 30 to 50 percent slopes, stony; about 8.1 miles east of Tuckasegee, 4.6 miles east of the intersection of North Carolina Highway 281 and Secondary Road 1760, about 500 feet south of the dam on Meade Lake, in a wooded area (State plane coordinates 575,950 feet N., 814,800 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A—0 to 5 inches; dark brown (7.5YR 3/4) gravelly fine sandy loam; weak medium granular structure; very

friable; many fine to coarse roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; common fine flakes of mica; very strongly acid; clear smooth boundary.

Bw1—5 to 17 inches; strong brown (7.5YR 4/6) fine sandy loam; weak medium subangular blocky structure; very friable; few medium and coarse roots; 5 percent, by volume, gravel; common fine flakes of mica; very strongly acid; gradual wavy boundary.

Bw2—17 to 28 inches; strong brown (7.5YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; few medium and coarse roots; 5 percent, by volume, gravel; common fine flakes of mica; strongly acid; gradual wavy boundary.

BC—28 to 37 inches; yellowish brown (10YR 5/6) sandy loam; few fine distinct strong brown (7.5YR 5/6) and common fine distinct yellow (10YR 7/6) mottles; weak fine subangular blocky structure; very friable; few medium and coarse roots; 5 percent, by volume, gravel; few fine flakes of mica; few medium rounded soft masses of iron-manganese; strongly acid; gradual wavy boundary.

C—37 to 60 inches; multicolored sandy loam that weathered from saprolite; massive; very friable; few medium roots; 10 percent, by volume, gravel; common fine flakes of mica; few medium rounded soft masses of iron-manganese; very strongly acid.

The thickness of the solum ranges from 20 to 50 inches. The depth to weathered bedrock is more than 60 inches. Reaction is very strongly acid to moderately acid in unlimed areas. The number of mica flakes is few or common. The content of rock fragments ranges from 0 to 35 percent, by volume, in the 10- to 40-inch control section.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. Where value is 3 and chroma is 2 or 3, the horizon is less than 7 inches thick.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 4 to 8. It is fine sandy loam, loam, or sandy loam in the fine-earth fraction.

The BC horizon, if it occurs, is similar in color and texture to the Bw horizon.

The C horizon is multicolored saprolite weathered from high-grade metamorphic rocks. It is fine sandy loam, sandy loam, loam, loamy fine sand, or loamy sand in the fine-earth fraction.

Ellijay Series

These soils are very deep, well drained, and moderately permeable. They formed in saprolite weathered from ultramafic rocks. They are on ridgetops and side slopes. Elevation generally ranges from 2,000 to 3,000 feet. Slope ranges from 2 to 30 percent. The soils are classified as fine, mixed, mesic Rhodic Kanhapludalfs.

Ellijay soils are geographically associated with Cowee, Evard, and Braddock soils. The associated soils have less than 35 percent base saturation. Cowee and Evard soils formed in saprolite weathered from high-grade metamorphic rocks. They are fine-loamy and are on the steeper adjacent mountains. Also, Cowee soils are moderately deep to weathered bedrock. Braddock soils formed in old alluvium or colluvium and are on high stream terraces or colluvial fans.

Typical pedon of Ellijay silty clay loam, 8 to 15 percent slopes, eroded; 3.5 miles south of Sylva on North Carolina Highway 107, about 1.9 miles southwest on North Carolina Highway 116, about 0.2 mile southeast of Webster on Secondary Road 1346, about 50 feet west of the road, in a wooded area (State plane coordinates 605,000 feet N., 740,000 feet E.):

A—0 to 4 inches; dusky red (10R 3/4) silty clay loam; moderate fine granular structure; very friable; many fine and coarse roots; 5 percent, by volume, gravel, cobbles, and stones; strongly acid; gradual wavy boundary.

Bt1—4 to 15 inches; dark red (10R 3/6) clay; moderate medium subangular blocky structure; friable, sticky and slightly plastic; many fine and coarse roots; 5 percent, by volume, gravel, cobbles, and stones in a line at the base of this horizon; strongly acid; gradual wavy boundary.

Bt2—15 to 34 inches; dark red (10R 3/6) clay; moderate medium subangular blocky structure; friable, sticky and slightly plastic; common fine and coarse roots; 5 percent, by volume, gravel, cobbles, and stones; moderately acid; gradual wavy boundary.

BC—34 to 52 inches; dark red (2.5YR 3/6) loam; weak medium subangular blocky structure; very friable; few fine and medium roots; 5 percent, by volume, gravel, cobbles, and stones; moderately acid; clear wavy boundary.

C1—52 to 59 inches; mottled yellowish red (5YR 5/6), reddish yellow (7.5YR 6/8), and brownish yellow (10YR 6/6) clay loam that weathered from saprolite; massive; very friable; few fine roots; 5 percent, by volume, gravel, cobbles, and stones; few black concretions; slightly acid; gradual wavy boundary.

C2—59 to 70 inches; mottled strong brown (7.5YR 5/8), yellowish red (5YR 5/8), and very pale brown (10YR 7/4) loam that weathered from saprolite; massive; very friable; 5 percent, by volume, gravel, cobbles, and stones; few black concretions; slightly acid.

The thickness of the solum ranges from 30 to 60

inches. The depth to bedrock is more than 60 inches. Reaction in the A horizon ranges from very strongly acid to moderately acid in unlimed areas. It ranges from strongly acid to neutral in the Bt, BC, and C horizons. A substantial calcium-magnesium imbalance is in the Bt, BC, and C horizons. The number of mica flakes ranges from none to common. The content of rock fragments is as much as 35 percent, by volume, in the A horizon and as much as 15 percent, by volume, in the other horizons.

The A or Ap horizon has hue of 10R to 7.5YR, value of 3, and chroma of 2 to 6.

Thin AB or BA horizons, if they occur, have hue of 10R to 5YR, value of 3, and chroma of 4 to 6. They are silty clay loam or clay loam in the fine-earth fraction.

The Bt horizon has hue of 10R or 2.5YR, value of 3, and chroma of 4 to 6. The dry color value is 4. The horizon is clay, silty clay loam, or clay loam in the fine-earth fraction.

The BC or CB horizon, if it occurs, has hue of 10R to 5YR, value of 3 to 6, and chroma of 4 to 8. It is loam, clay loam, or silty clay loam in the fine-earth fraction.

The C horizon is multicolored saprolite. It is loam, clay loam, fine sandy loam, or sandy loam in the fine-earth fraction.

Evard Series

These soils are very deep, well drained, and moderately permeable (fig. 20). They formed in saprolite weathered from high-grade metamorphic rocks. They are generally on ridgetops and south- to west-facing side slopes. Elevation generally ranges from 2,000 to 3,500 feet. Slope ranges from 8 to 95 percent. The soils are classified as fine-loamy, oxidic, mesic Typic Hapludults.

Evard soils are geographically associated with Cowee and Trimont soils. Cowee soils are moderately deep to weathered bedrock and are on the upper part of side slopes or on spur ridges. Trimont soils have a humic epipedon and generally are on north- to east-facing side slopes.

Typical pedon of Evard gravelly loam, in an area of Evard-Cowee complex, 50 to 95 percent slopes; 0.8 mile west of the entrance to Western Carolina University in Cullowhee, 2,000 feet south of the Jackson County Airport terminal on Airport Road, 100 feet south of the intersection of Airport Road and a power transmission line (State plane coordinates 593,000 feet N., 746,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A1—0 to 3 inches; dark brown (7.5YR 4/4) gravelly loam; weak fine granular structure; very friable; common fine to coarse roots; 20 percent, by volume, gravel; common fine flakes of mica; strongly acid; clear wavy boundary.

A2—3 to 6 inches; strong brown (7.5YR 4/6) gravelly loam; moderate medium granular structure; very friable; common fine and medium roots; 20 percent, by volume, gravel; common fine flakes of mica; strongly acid; clear wavy boundary.

Bt1—6 to 14 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; friable, sticky and slightly plastic; common medium and coarse roots; few discontinuous clay films on faces of peds; 10 percent, by volume, gravel; common fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt2—14 to 27 inches; red (2.5YR 4/6) clay loam; moderate fine and medium subangular blocky structure; friable, sticky and slightly plastic; common medium and coarse roots; few discontinuous clay films on faces of peds; 10 percent, by volume, gravel; common fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—27 to 35 inches; mottled red (2.5YR 4/6), yellowish red (5YR 4/6), and strong brown (7.5YR 4/6) loam; weak medium subangular blocky structure; friable; few medium and coarse roots; 10 percent, by volume, gravel; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C—35 to 60 inches; multicolored sandy loam that weathered from saprolite; massive; friable; few coarse roots; 10 percent, by volume, gravel; common fine flakes of mica; common manganese coatings on saprolite cleavage planes; very strongly acid.

The thickness of the solum ranges from 20 to 40 inches or more. The depth to weathered, high-grade metamorphic crystalline bedrock is more than 60 inches. Reaction is very strongly acid to moderately acid in unlimed areas. The number of mica flakes is few or common. The content of rock fragments ranges from 0 to 35 percent, by volume.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 6. Where value is 3 and chroma is 3 or 4, the horizon is less than 6 inches thick.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 8. It is loam, sandy clay loam, or clay loam in the fine-earth fraction.

The BC horizon, if it occurs, has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8. It is sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam in the fine-earth fraction.

The C horizon is multicolored saprolite weathered from high-grade metamorphic rocks. It is sandy loam,

fine sandy loam, loam, loamy fine sand, or loamy sand in the fine-earth fraction.

Fannin Series

These soils are very deep, well drained, and moderately permeable. They formed in saprolite weathered from mica-rich, high-grade metamorphic rocks. They are generally on ridgetops and south- to west-facing side slopes. Elevation is generally 2,000 to 3,500 feet. Slope ranges from 8 to 95 percent. The soils are classified as fine-loamy, micaceous, mesic Typic Hapludults.

Fannin soils are geographically associated with Cashiers and Chandler soils. The associated soils are browner in color than the Fannin soils and are coarse-loamy. Also, Cashiers soils have an Umbric Dystrochrept feature and generally are on north- to east-facing side slopes.

Typical pedon of Fannin fine sandy loam, 30 to 50 percent slopes; 8.2 miles south of the intersection of U.S. Highway 64 and North Carolina Highway 107 in Cashiers, 0.1 mile southeast of the intersection of Secondary Roads 1100 and 1101, about 100 feet north of Secondary Road 1100, in a wooded area (State plane coordinates 486,000 feet N., 773,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves and needles of deciduous and coniferous plants.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine and medium granular structure; very friable; many fine and medium roots; common fine flakes of mica; very strongly acid; clear smooth boundary.

BA—3 to 6 inches; strong brown (7.5YR 4/6) loam; weak medium subangular blocky structure; very friable; common fine and medium roots; common fine and medium flakes of mica; strongly acid; clear wavy boundary.

Bt—6 to 24 inches; yellowish red (5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; common medium roots; few discontinuous clay films on faces of peds; many fine and medium flakes of mica; strongly acid; gradual wavy boundary.

BC—24 to 42 inches; yellowish red (5YR 5/8) sandy loam; weak fine subangular blocky structure; very friable; few medium roots; many fine flakes of mica; strongly acid; gradual wavy boundary.

C—42 to 60 inches; yellowish red (5YR 5/8) sandy loam that weathered from saprolite; massive; very friable; many fine flakes of mica; strongly acid.

The thickness of the solum ranges from 20 to more than 45 inches. The depth to bedrock is more than 72 inches. Reaction is very strongly acid to moderately acid in unlimed areas. The number of mica flakes is common or many in the surface layer and the upper part of the Bt horizon and is many in the lower part of the Bt horizon and in the BC and C horizons. The content of mica is 40 percent or more in the control section. The content of rock fragments ranges from 0 to 35 percent, by volume, in the control section.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. Where value is 3 and chroma is 2 to 4, the horizon is less than 6 inches thick.

Some pedons have a BA horizon. This horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is fine sandy loam or loam in the fine-earth fraction.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. It is loam, sandy clay loam, or clay loam in the fine-earth fraction.

The BC horizon, if it occurs, is similar in color to the Bt horizon. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The C horizon is yellowish red (5YR 5/8) or multicolored saprolite weathered from mica-rich, high-grade metamorphic rocks. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

Hemphill Series

These soils are very deep, very poorly drained, and slowly permeable. They formed in alluvium. They are on low stream terraces. Elevation generally ranges from 1,850 to 2,500 feet. Slope ranges from 0 to 3 percent. The soils are classified as fine, mixed, mesic Typic Umbraqualfs.

Hemphill soils are geographically associated with Dillard and Statler soils. The associated soils are fine-loamy and are in slightly elevated areas. Dillard soils are moderately well drained, and Statler soils are well drained.

Typical pedon of Hemphill clay loam, 0 to 3 percent slopes, rarely flooded; about 0.5 mile southeast of Whittier on Secondary Road 1397, about 0.2 mile north of an entrance to a farm (State plane coordinates 638,000 feet N., 703,000 feet E.):

Ap—0 to 13 inches; very dark gray (10YR 3/1) clay loam; weak fine and medium granular structure; friable; many fine and medium roots; common fine and medium flakes of mica; slightly acid; clear smooth boundary.

Btg1—13 to 20 inches; dark grayish brown (10YR 4/2) clay; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm, slightly sticky and slightly

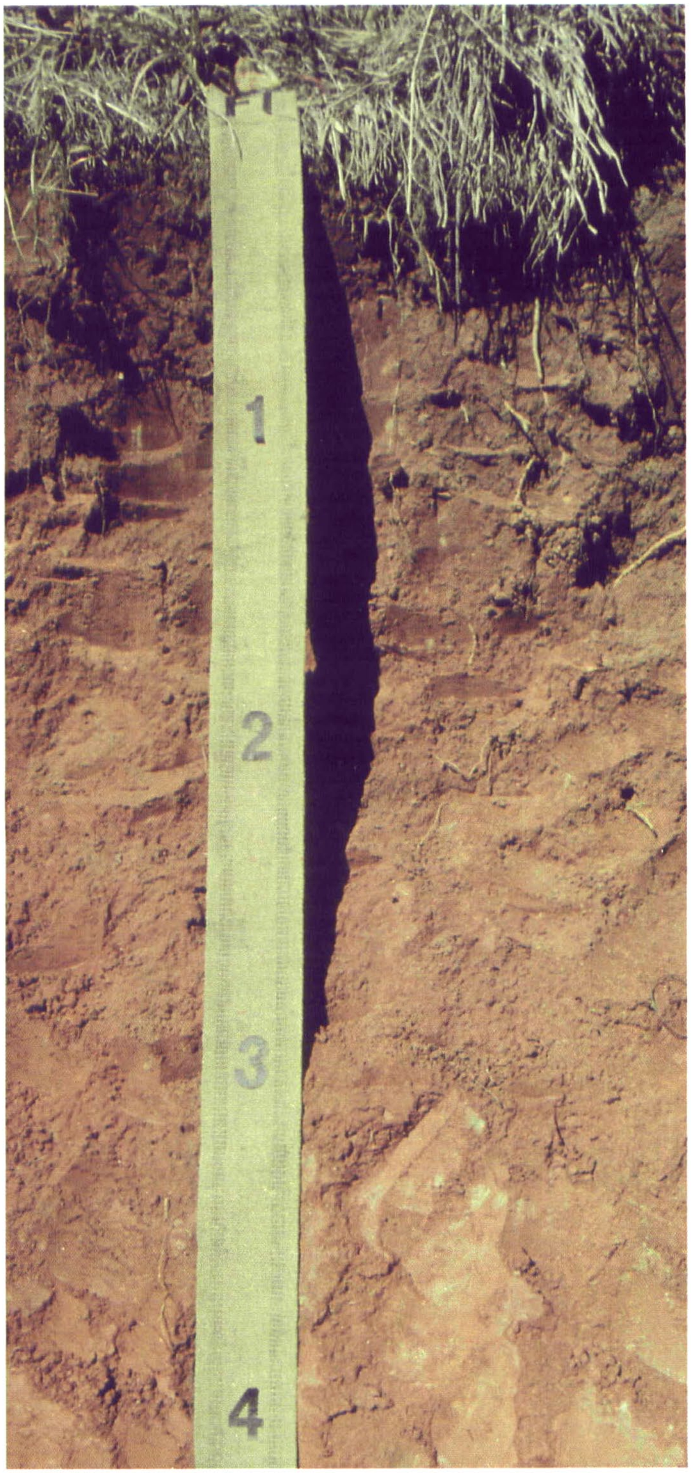

Figure 20.—Typical pedon of Evard gravelly loam. These loamy soils typically have a thin surface layer and are very deep to bedrock. Depth is marked in feet.

Figure 21.—Typical pedon of Junaluska channery fine sandy loam. These soils are moderately deep to soft metasedimentary rocks. Depth is marked in feet.

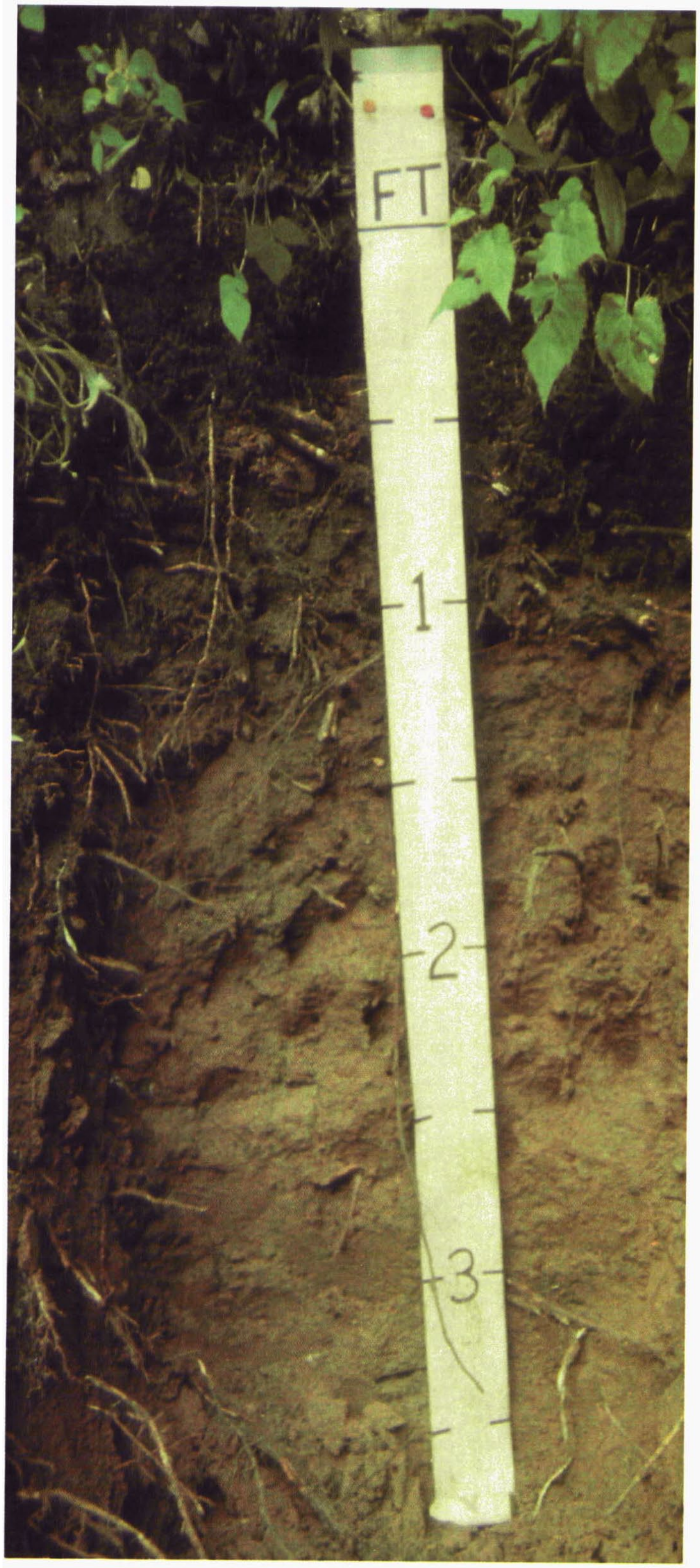

Figure 22.—Typical pedon of Saunook gravelly loam. These soils have a dark surface layer that typically extends to a depth of about 9 inches. Depth is marked in feet.

Figure 23.—Typical pedon of Trimont gravelly loam. These soils are very deep and well drained and commonly are on the cool lower mountainsides. Depth is marked in feet.

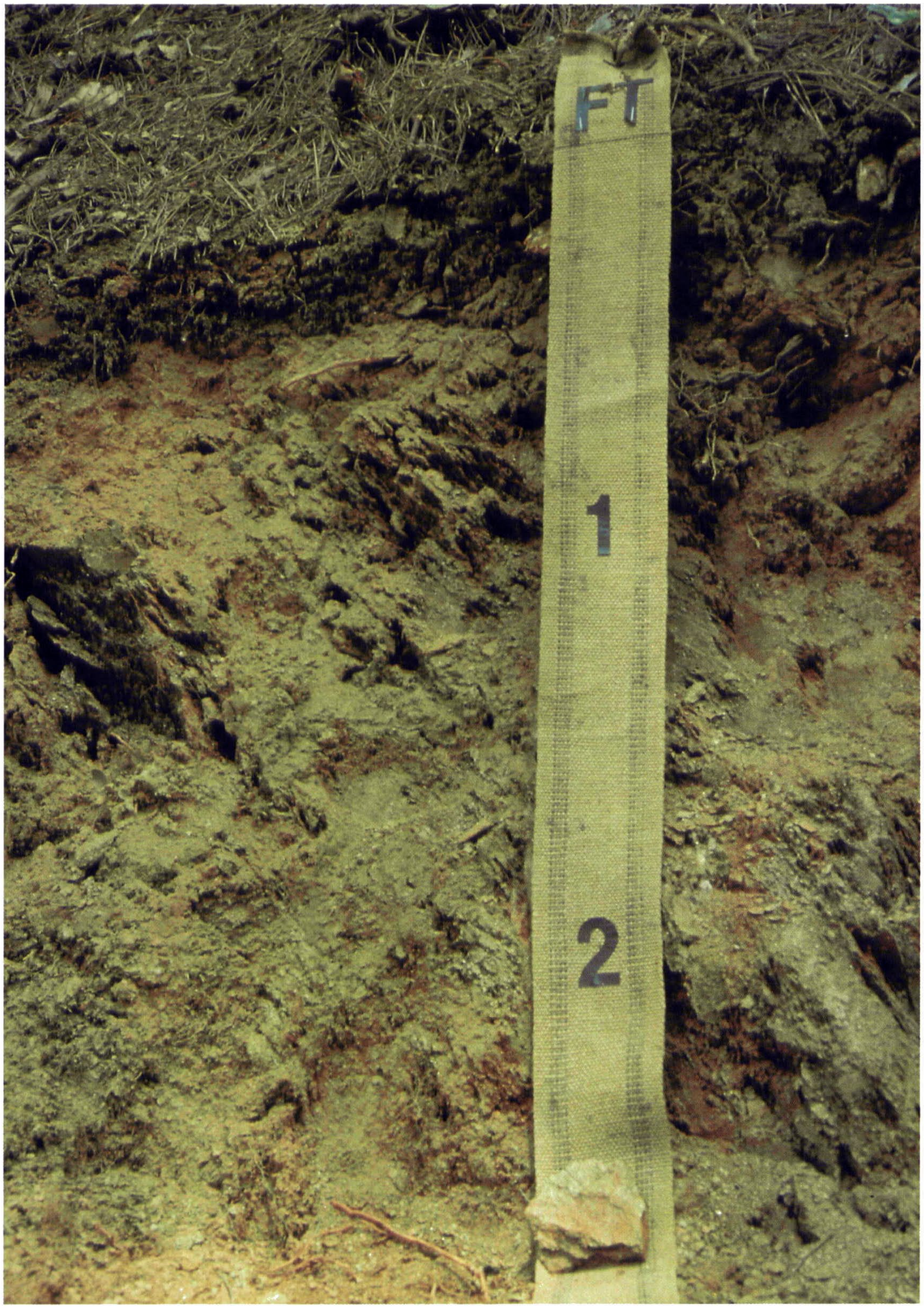

Figure 24.—Typical pedon of Tsali channery fine sandy loam. These soils have soft bedrock at a depth of 12 to 20 inches. Depth is marked in feet.

Figure 25.—Typical pedon of Tuckasegee gravelly loam. These soils have a thick, dark surface layer and commonly are on benches in coves. Depth is marked in feet.

plastic; common fine and medium roots between peds; common fine and medium pores; few distinct clay films on faces of peds; common fine and medium flakes of mica; strongly acid; clear wavy boundary.

Btg2—20 to 26 inches; grayish brown (10YR 5/2) clay; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine and medium roots between peds; few fine and medium pores; few distinct clay films on faces of peds; common fine and medium flakes of mica; strongly acid; gradual wavy boundary.

Btg3—26 to 38 inches; grayish brown (10YR 5/2) clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; moderate coarse subangular blocky structure; firm, slightly sticky and slightly plastic; few fine and medium roots between peds; few fine and medium pores; few distinct clay films on faces of peds; common fine and medium flakes of mica; strongly acid; gradual wavy boundary.

BCg1—38 to 44 inches; light brownish gray (10YR 6/2) loam; many medium prominent strong brown (7.5YR 5/6) mottles; moderate coarse subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots and pores; common fine and medium flakes of mica; moderately acid; gradual wavy boundary.

BCg2—44 to 64 inches; light brownish gray (10YR 6/2) fine sandy loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; weak fine and medium platy structure; friable, nonsticky and nonplastic; few coarse roots; many fine and medium flakes of mica; moderately acid; abrupt smooth boundary.

Cg—64 to 80 inches; dark gray (N 4/0) fine sandy loam; massive; very friable, nonsticky and nonplastic; few coarse roots; many fine and medium flakes of mica; strongly acid.

The thickness of the solum ranges from 40 to 60 inches or more. The depth to bedrock is more than 60 inches. Reaction is very strongly acid to neutral. The number of mica flakes is few or common in the A and Btg horizons and ranges from few to many in the BCg, Cg, and C horizons, if they occur. The content of rock fragments ranges from 0 to 15 percent, by volume, in the A, Btg, BCg, and Cg horizons. In some pedons, the Cg horizon is as much as 60 percent, by volume, rock fragments.

The Ap or A horizon has hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 3, or it is neutral in hue and has value of 2 or 3.

The Btg horizon commonly has hue of 7.5YR to 5Y, value of 2 to 6, and chroma of 0 to 2, or it is neutral in hue and has value of 2 to 6. In some pedons, this horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1. It is silty clay, clay loam, silty clay loam, or clay in the fine-earth fraction.

The BCg or CBg horizon, if it occurs, typically has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 0 to 2, or it is neutral in hue and has value of 4 to 6. In some pedons, it has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1. It is sandy loam, fine sandy loam, loam, sandy clay loam, silt loam, silty clay loam, silty clay, clay loam, or clay in the fine-earth fraction.

The Cg horizon, if it occurs, is similar in color to the BCg horizon and ranges from sand to clay loam in the fine-earth fraction.

Junaluska Series

These soils are moderately deep, well drained, and moderately permeable. They formed in saprolite weathered from metasedimentary rocks, such as phyllite or metasandstone (fig. 21). They are on ridgetops and side slopes. Elevation generally ranges from 1,900 to 3,500 feet. Slope ranges from 15 to 95 percent. The soils are classified as fine-loamy, mixed, mesic Typic Hapludults.

Junaluska soils are geographically associated with Brasstown and Tsali soils. Brasstown soils are deep to weathered bedrock and are on the lower side slopes. Tsali soils are shallow to weathered bedrock and are on narrow ridges and dissected side slopes.

Typical pedon of Junaluska channery fine sandy loam, in an area of Junaluska-Brasstown complex, 30 to 50 percent slopes; about 0.4 mile northeast of Wilmot on Cane Branch, 0.25 mile northwest of Cane Branch, in a wooded area (State plane coordinates 631,000 feet N., 717,000 feet E.):

Oi—1 inch to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A—0 to 3 inches; dark brown (10YR 4/3) channery fine sandy loam; weak medium granular structure; very friable; many fine to coarse roots; 20 percent, by volume, channers; few fine flakes of mica; very strongly acid; clear wavy boundary.

BA—3 to 13 inches; strong brown (7.5YR 5/6) channery loam; weak medium subangular blocky structure; friable; common fine to coarse roots; 20 percent, by volume, channers; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt—13 to 28 inches; yellowish red (5YR 5/8) channery clay loam; weak fine and medium subangular blocky structure; friable; common fine and medium roots; few distinct clay films on faces of peds; 25 percent, by volume, channers; few fine flakes of mica; very

strongly acid; clear irregular boundary.

Cr—28 to 60 inches; multicolored, weathered, fractured phyllite; few thin seams of yellowish red (5YR 5/8) clay loam in rock fractures.

The thickness of the solum ranges from 16 to 39 inches. The depth to weathered bedrock is 20 to 40 inches. The depth to hard bedrock is more than 40 inches. Reaction is very strongly acid or strongly acid in unlimed areas. The number of mica flakes is few or common. The content of rock fragments ranges from 5 to 35 percent, by volume.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 8. Where value is 3 and chroma is 3 or 4, the horizon is less than 6 inches thick.

The BA horizon, if it occurs, has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is loam or fine sandy loam in the fine-earth fraction.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, clay loam, or loam in the fine-earth fraction.

The BC horizon, if it occurs, has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is loam or fine sandy loam in the fine-earth fraction.

The C horizon, if it occurs, is multicolored saprolite weathered from metasedimentary rock. It is fine sandy loam or loam in the fine-earth fraction.

The Cr horizon is multicolored, weathered, partly consolidated metasedimentary rock, such as phyllite or metasandstone.

Nikwasi Series

These soils are moderately deep to strata of sand, gravel, and cobbles and very deep to bedrock. They are poorly drained or very poorly drained and are moderately rapidly permeable in the A horizon and rapidly permeable in the C horizon. They formed in recent alluvium derived from high-grade metamorphic or metasedimentary rocks. They are on narrow flood plains along small streams near the area of contact between the flood plains and the uplands. Elevation generally ranges from 1,850 to 3,000 feet. Slope ranges from 0 to 2 percent. The soils are classified as coarse-loamy over sandy or sandy-skeletal, mixed, nonacid, mesic Cumulic Humaquepts.

Nikwasi soils are geographically associated with Cullowhee, Dellwood, and Reddies soils. Cullowhee soils are somewhat poorly drained and are in slight depressions. Dellwood soils are moderately well drained and are shallow to strata of sand, gravel, or cobbles. They contain more than 35 percent rock fragments, by volume, in the 10- to 40-inch control section. Reddies soils are moderately well drained and are in slightly elevated areas.

Typical pedon of Nikwasi fine sandy loam, 0 to 2 percent slopes, frequently flooded; about 6 miles northeast of Sylva on U.S. Highways 19 and 23, about 2,000 feet northeast of Mt. Pleasant Church, 75 feet east of Scott Creek, in a hay field (State plane coordinates 632,000 feet N., 776,000 feet E.):

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam; moderate fine granular structure; very friable; common fine roots; few rounded gravel; common fine and medium flakes of mica; slightly acid; clear wavy boundary.

A—8 to 26 inches; very dark gray (10YR 3/1) fine sandy loam; weak medium granular structure; very friable; common fine roots; few rounded gravel; common fine and medium flakes of mica; slightly acid; clear smooth boundary.

Cg—26 to 60 inches; dark grayish brown (10YR 4/2) and multicolored extremely gravelly coarse sand; single grained; loose; dominantly waterworn gravel and many cobbles; common fine and medium flakes of mica; moderately acid.

The solum is 24 to 40 inches deep over strata of sand, gravel, or cobbles. The strata have more than 35 percent, by volume, gravel and cobbles. Rock fragments, dominantly of gravel size, are in the A and Bw horizons in some pedons, but they make up less than 35 percent of the volume. The depth to bedrock is more than 60 inches. Reaction is very strongly acid to slightly acid. The number of mica flakes is few or common.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3.

The Cg horizon has hue of 2.5Y or 10YR, value of 4 to 7, and chroma of 1 or 2, or it is neutral and has value of 4 to 7. It is coarse sand, sand, or loamy sand in the fine-earth fraction.

Oconaluftee Series

These soils are very deep, well drained, and moderately rapidly permeable. They formed in saprolite weathered from metasedimentary rocks. They are on ridgetops and side slopes. Elevation is generally above 4,800 feet. Slope ranges from 15 to 95 percent. The soils are classified as coarse-loamy, mixed, frigid Typic Haplumbrepts.

Oconaluftee soils are geographically associated with Cheoah, Soco, and Stecoah soils. The associated soils generally are below 4,800 feet in elevation. Cheoah and Stecoah soils are deep to weathered bedrock, and Soco soils are moderately deep to weathered bedrock. Cheoah soils are on north- to east-facing side slopes.

Soco and Stecoah soils are on south- to west-facing slopes and have an ochric epipedon.

Typical pedon of Oconaluftee channery loam, windswept, 50 to 95 percent slopes; about 7.8 miles northeast of Cherokee on U.S. Highway 19 to Soco Gap, 2.0 miles northeast on the Blue Ridge Parkway, 400 feet west of the parkway at the north end of Bunches Bald Tunnel (State plane coordinates 668,000 feet N., 752,000 feet E.):

Oe—2 inches to 0; partly decomposed organic litter and root mat.

A1—0 to 8 inches; black (10YR 2/1) channery loam; weak fine granular structure; very friable; many fine and medium roots; 25 percent, by volume, phyllite and metasandstone channers and flagstones; common fine flakes of mica; extremely acid; clear wavy boundary.

A2—8 to 19 inches; dark brown (10YR 3/3) channery loam; weak medium granular structure; very friable; common fine and medium roots; 20 percent, by volume, phyllite and metasandstone channers; common fine flakes of mica; strongly acid; clear wavy boundary.

Bw—19 to 35 inches; dark yellowish brown (10YR 4/4) channery fine sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; 20 percent, by volume, phyllite and metasandstone channers; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C—35 to 67 inches; olive brown (2.5Y 4/4), white (10YR 8/2), gray (10YR 6/1), and black (10YR 2/1) channery fine sandy loam that weathered from saprolite weathered from interbedded phyllite and metasandstone; rock-controlled structure; few fine and medium roots; 25 percent, by volume, phyllite and metasandstone channers; common fine flakes of mica; strongly acid.

The thickness of the solum ranges from 30 to 60 inches. Reaction ranges from extremely acid to strongly acid in the A horizon and from very strongly acid to moderately acid in the other horizons. The number of mica flakes is few or common. The content of rock fragments is as much as 35 percent, by volume.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3.

Some pedons have an AB horizon. This horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. It is loam, fine sandy loam, or silt loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is loam, fine sandy loam, or silt loam in the fine-earth fraction.

Some pedons have a BC horizon. This horizon is similar in color and texture to the Bw horizon.

The C horizon is saprolite weathered from metasedimentary rocks, such as phyllite and metasandstone. It varies in color and is fine sandy loam, loam, or silt loam in the fine-earth fraction.

Plott Series

These soils are very deep, well drained, and moderately rapidly permeable. They formed in saprolite weathered from high-grade metamorphic rocks. They generally are on shaded ridgetops and north- to east-facing side slopes. Elevation generally ranges from 3,500 to 4,800 feet. Slope ranges from 15 to 95 percent. The soils are classified as coarse-loamy, mixed, mesic Typic Haplumbrepts.

Plott soils are geographically associated with Chestnut and Edneyville soils. The associated soils have an ochric epipedon and are generally on south- to west-facing side slopes. Also, Chestnut soils are moderately deep to weathered bedrock.

Typical pedon of Plott fine sandy loam, 30 to 50 percent slopes, stony; about 2.0 miles west of the dam on Lake Thorpe on Secondary Road 1157, about 0.5 mile south of Double Spring Church, 600 feet west of Secondary Road 1157, in a wooded area (State plane coordinates 555,000 feet N., 748,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous and coniferous plant material.

A1—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam; moderate fine and medium granular structure; very friable; many fine to coarse roots; 5 percent, by volume, gravel and 5 percent, by volume, cobbles; few fine flakes of mica; strongly acid; clear wavy boundary.

A2—8 to 12 inches; dark brown (10YR 3/3) gravelly fine sandy loam; moderate fine and medium granular structure; very friable; many fine to coarse roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; few fine flakes of mica; strongly acid; clear wavy boundary.

Bw1—12 to 18 inches; dark yellowish brown (10YR 4/4) gravelly loam; moderate medium subangular blocky structure; very friable; common medium and coarse roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bw2—18 to 26 inches; dark yellowish brown (10YR 4/6) cobbly fine sandy loam; moderate medium subangular blocky structure; very friable; few medium and coarse roots; 15 percent, by volume, cobbles and 5 percent, by volume, gravel; common

fine flakes of mica; strongly acid; gradual wavy boundary.

BC—26 to 36 inches; yellowish brown (10YR 5/6) cobbly fine sandy loam; weak medium subangular blocky structure; very friable; few medium and coarse roots; 15 percent, by volume, cobbles and 5 percent, by volume, gravel; common fine flakes of mica; strongly acid; gradual wavy boundary.

C1—36 to 45 inches; light yellowish brown (10YR 6/4) cobbly sandy loam; massive; very friable; few medium and coarse roots; 15 percent, by volume, cobbles and 5 percent, by volume, gravel; common fine flakes of mica; strongly acid; gradual wavy boundary.

C2—45 to 60 inches; multicolored cobbly sandy loam that weathered from saprolite; massive; very friable; few medium roots; 20 percent, by volume, cobbles and 5 percent, by volume, gravel; common fine flakes of mica; strongly acid.

The thickness of the solum is 30 to more than 60 inches. The depth to bedrock is more than 60 inches. Reaction ranges from extremely acid to moderately acid in unlimed areas. The number of mica flakes is few or common. The content of rock fragments is as much as 35 percent, by volume, in the 10- to 40-inch control section. Below a depth of 40 inches, the content of rock fragments may be as much as 60 percent, by volume, in the lower part of the Bw horizon and in the BC and C horizons.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3.

Some pedons have a thin AB or BA horizon. This horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 4 to 8. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The BC or CB horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The C horizon, if it occurs, is light yellowish brown (10YR 6/4) or multicolored saprolite weathered from high-grade metamorphic rocks. It is fine sandy loam, sandy loam, loamy fine sand, or loamy sand in the fine-earth fraction.

Reddies Series

These soils are moderately deep to strata of sand, gravel, and cobbles and very deep to bedrock. They are moderately well drained and are moderately rapidly permeable in the surface layer and the subsoil and rapidly permeable or very rapidly permeable in the underlying material. They formed in recent alluvium derived from high-grade metamorphic or metasedimentary rocks. They are on narrow flood plains along small streams. Elevation generally ranges from 1,850 to 3,000 feet. Slope ranges from 0 to 2 percent. The soils are classified as coarse-loamy over sandy or sandy-skeletal, mixed, mesic Fluventic Haplumbrepts.

Reddies soils are geographically associated with Cullowhee, Dellwood, and Nikwasi soils. Cullowhee and Nikwasi soils are in depressions. Cullowhee soils are somewhat poorly drained, and Nikwasi soils are poorly drained and very poorly drained. Dellwood soils are moderately well drained and are shallow to strata of sand, gravel, or cobbles. They have more than 35 percent, by volume, rock fragments in the 10- to 40-inch control section.

Typical pedon of Reddies fine sandy loam, 0 to 2 percent slopes, occasionally flooded; 3.2 miles east of Cullowhee, 1.25 miles northeast of the intersection of North Carolina Highway 107 and Secondary Road 1737, about 200 feet south of the intersection of Secondary Roads 1737 and 1740, in a broccoli field (State plane coordinates 600,000 feet N., 740,000 feet E.):

Ap—0 to 14 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; 5 percent, by volume, gravel; common fine flakes of mica; neutral; clear smooth boundary.

Bw—14 to 26 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; common fine and medium flakes of mica; slightly acid; clear irregular boundary.

C1—26 to 41 inches; dark yellowish brown (10YR 4/6) very gravelly sand; single grained; loose; 40 percent, by volume, gravel and 5 percent, by volume, cobbles; common fine and medium flakes of mica; slightly acid; abrupt wavy boundary.

C2—41 to 60 inches; multicolored very gravelly sand; single grained; loose; 40 percent, by volume, gravel and 10 percent, by volume, cobbles; common fine and medium flakes of mica; moderately acid.

The solum is 20 to 39 inches deep over strata of sand, gravel, or cobbles. The strata have more than 35 percent, by volume, gravel or cobbles. Rock fragments, dominantly of gravel size, are in the A and Bw horizons in some pedons, but they make up less than 35 percent of the volume. The depth to bedrock is more than 60 inches. Reaction is moderately acid to neutral. The number of mica flakes is few or common.

The Ap or A horizon has hue of 7.5YR or 10YR and value and chroma of 2 or 3.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The C horizon has hue of 10YR, value of 3 to 6, and chroma of 2 to 8 or is multicolored. It is sand, loamy sand, or loamy fine sand in the fine-earth fraction.

Rosman Series

These soils are very deep, well drained or moderately well drained, and moderately rapidly permeable. They formed in recent alluvium. They are on flood plains along large streams. Elevation generally ranges from 1,850 to 2,500 feet. Slope ranges from 0 to 2 percent. The soils are classified as coarse-loamy, mixed, mesic Fluventic Haplumbrepts.

Rosman soils are geographically associated with Biltmore and Statler soils. Biltmore soils are sandy and are on natural levees along the stream channels. Statler soils are fine-loamy and are on slightly elevated low stream terraces.

Typical pedon of Rosman fine sandy loam, 0 to 2 percent slopes, occasionally flooded; about 0.8 mile southeast of Whittier on Secondary Road 1397, about 500 feet north of the road, on a farm (State plane coordinates 638,000 feet N., 704,000 feet E.):

Ap—0 to 13 inches; dark brown (7.5YR 3/2) fine sandy loam; weak medium granular structure; very friable; common very fine and fine roots; common fine and medium tubular pores; 1 percent, by volume, rounded gravel; common fine flakes of mica; moderately acid; gradual smooth boundary.

C/A—13 to 24 inches; 70 percent reddish brown (5YR 4/4) and 30 percent dark brown (7.5YR 3/2) fine sandy loam; massive; very friable; common fine and very fine roots; common fine and medium tubular pores; 1 percent, by volume, rounded gravel; common fine flakes of mica; slightly acid; diffuse smooth boundary.

C—24 to 65 inches; brown (7.5YR 5/4) fine sandy loam; massive; very friable; few very fine and fine roots; common fine and medium tubular pores; common fine flakes of mica; slightly acid; gradual smooth boundary.

Ab—65 to 73 inches; very dark grayish brown (10YR 3/2) very fine sandy loam; common fine and medium distinct dark brown to brown (7.5YR 4/4) and common fine and medium faint light gray (N 7/0) and gray (N 5/0) mottles; weak fine and medium subangular blocky structure; friable; few very fine and fine roots; common fine and medium tubular pores; common fine flakes of mica; slightly acid.

The loamy sediments are 40 to 60 inches or more deep over strata of sand, gravel, and cobbles. These soils are mottled in chroma of 2 or less within a depth of 20 to 36 inches in some pedons. Reaction is strongly acid to slightly acid in unlimed areas. The number of mica flakes range from few to many. Strata of contrasting textures occur below a depth of 40 inches in some pedons.

The Ap or A horizon has hue of 7.5YR to 2.5Y, value of 3, and chroma of 1 to 3.

Some pedons have an Ab horizon. This horizon has hue of 7.5YR to 2.5Y, value of 3, and chroma of 1 to 3. It is very fine sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The C/A horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 3, and chroma of 1 to 3 in the A part of the horizon. The C part has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. This horizon is fine sandy loam or loam in the fine-earth fraction.

The C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. In some pedons, mottles that have chroma of 2 or less are below a depth of 20 inches. This horizon is fine sandy loam or loam in the fine-earth fraction.

The Rosman soils in Jackson County are taxadjuncts because they have a base saturation of more than 50 percent throughout. However, this difference does not affect the overall use, management, and behavior of these soils.

Santeetlah Series

These soils are very deep, well drained, and moderately rapidly permeable. They formed in colluvium derived from metasedimentary rocks. They are on toe slopes and benches in coves. Elevation generally ranges from 2,000 to 4,800 feet. Slope ranges from 15 to 50 percent. The soils are classified as coarse-loamy, mixed, mesic Typic Haplumbrepts.

Santeetlah soils are geographically associated with Spivey soils, which are loamy-skeletal and are mixed with areas of the Santeetlah soils along drainageways.

Typical pedon of Santeetlah flaggy loam, in an area of Spivey-Santeetlah complex, 30 to 50 percent slopes, stony; about 4.3 miles northeast of Wilmot, 1.7 miles east of the confluence of the east and west forks of Dicks Creek on Secondary Road 1389 (State plane coordinates 545,500 feet N., 596,500 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A1—0 to 6 inches; very dark brown (10YR 2/2) flaggy

loam; weak fine granular structure; very friable; many fine to coarse roots; 15 percent, by volume, flagstones and 5 percent, by volume, channers; few fine flakes of mica; very strongly acid; clear smooth boundary.

A2—6 to 12 inches; dark brown (10YR 3/3) flaggy loam; weak medium granular structure; very friable; many fine to coarse roots; 10 percent, by volume, flagstones and 5 percent, by volume, channers; common fine and medium flakes of mica; very strongly acid; clear wavy boundary.

Bw1—12 to 18 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; few fine and medium roots; 5 percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bw2—18 to 28 inches; strong brown (7.5YR 4/6) loam; moderate medium subangular blocky structure; friable; few fine and medium roots; 5 percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

BC—28 to 60 inches; dark yellowish brown (10YR 4/6) channery fine sandy loam; weak medium subangular blocky structure; friable; few fine and medium roots; 15 percent, by volume, channers; common fine flakes of mica; strongly acid.

The thickness of the solum ranges from 30 to more than 60 inches. The depth to bedrock is more than 60 inches. In unlimed areas, reaction is extremely acid to moderately acid. The content of rock fragments, mainly channers or flagstones, may be as much as 35 percent, by volume, in the 10- to 40-inch control section and as much as 60 percent, by volume, below a depth of 40 inches. The number of mica flakes is few or common.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is fine sandy loam or loam in the fine-earth fraction.

Some pedons have a BC horizon. This horizon is similar in color and texture to the Bw horizon.

The C horizon, if it occurs, is multicolored colluvium. It is loamy sand, sandy loam, or fine sandy loam in the fine-earth fraction.

Saunook Series

These soils are very deep, well drained, and moderately permeable. They formed in colluvium derived from high-grade metamorphic rocks. They are on benches and toe slopes in coves. Elevation generally ranges from 2,000 to 3,500 feet. Slope ranges from 2 to 30 percent. The soils are classified as fine-loamy, mixed, mesic Humic Hapludults (fig. 22).

Saunook soils are geographically associated with Cowee, Evard, and Trimont soils. The associated soils formed in material that weathered from saprolite on the adjacent uplands. Cowee and Evard soils generally are on south- to west-facing slopes, and Trimont soils generally are on north- to east-facing side slopes. Also, Cowee soils are moderately deep to weathered bedrock.

Typical pedon of Saunook gravelly loam, 8 to 15 percent slopes; 8.0 miles south of Dillsboro, 0.8 mile east of the intersection of U.S. Highway 441 and Secondary Road 1318, about 300 feet north of Secondary Road 1318, in a hay field (State plane coordinates 740,000 feet N., 635,000 feet E.):

Ap—0 to 9 inches; dark brown (7.5YR 3/4) gravelly loam; moderate medium granular structure; very friable; many fine and medium roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; few fine flakes of mica; slightly acid; clear wavy boundary.

Bt1—9 to 17 inches; strong brown (7.5YR 4/6) gravelly clay loam; dark brown (7.5YR 3/4) gravelly loam from the A horizon in old root channels; moderate medium subangular blocky structure; friable; common fine and medium roots; few discontinuous clay films on faces of peds; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; few fine flakes of mica; moderately acid; gradual wavy boundary.

Bt2—17 to 24 inches; strong brown (7.5YR 5/6) gravelly sandy clay loam; weak medium subangular blocky structure; friable; common fine and few medium roots; few discontinuous clay films on faces of peds; 15 percent, by volume, gravel; few fine flakes of mica; moderately acid; gradual wavy boundary.

BC1—24 to 30 inches; strong brown (7.5YR 5/8) gravelly sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; 20 percent, by volume, gravel and 5 percent, by volume, cobbles; few fine flakes of mica; moderately acid; gradual wavy boundary.

BC2—30 to 44 inches; strong brown (7.5YR 5/8) sandy loam; common medium distinct dark brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; very friable; few fine and medium roots; 10 percent, by volume, cobbles; few fine flakes of mica; moderately acid; gradual wavy boundary.

C—44 to 60 inches; yellowish brown (10YR 5/6) cobbly fine sandy loam; massive; friable; 20 percent, by volume, cobbles and 5 percent, by volume, gravel; common fine flakes of mica; moderately acid.

The thickness of the solum is 40 to more than 60 inches. The depth to bedrock is more than 60 inches.

Reaction is extremely acid to moderately acid in the surface layer in unlimed areas. It ranges from very strongly acid to moderately acid below the A horizon. The number of mica flakes is few or common. The content of rock fragments ranges from 0 to 35 percent, by volume, in the A and Bt horizons and is as much as 60 percent, by volume, in the BC and C horizons.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2 to 4 or has hue of 7.5YR, value of 3, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is loam, sandy clay loam, or clay loam in the fine-earth fraction.

The BC horizon, if it occurs, is similar in color to the Bt horizon. It is fine sandy loam, sandy loam, loam, or sandy clay loam in the fine-earth fraction.

The C horizon, if it occurs, is yellowish brown or multicolored colluvium. It is sandy loam, fine sandy loam, loam, or loamy sand in the fine-earth fraction.

Soco Series

These soils are moderately deep, well drained, and moderately rapidly permeable. They formed in saprolite weathered from metasedimentary rocks. They generally are on ridgetops and south- to west-facing side slopes. Elevation generally ranges from 3,500 to 4,800 feet. Slope ranges from 15 to 95 percent. The soils are classified as coarse-loamy, mixed, mesic Typic Dystrochrepts.

Soco soils are geographically associated with Cheoah and Stecoah soils. The associated soils are deep to weathered bedrock. Also, Cheoah soils have an umbric epipedon and are generally on north- to east-facing side slopes.

Typical pedon of Soco channery loam, in an area of Soco-Stecoah complex, 30 to 50 percent slopes; 10 miles northeast of Cherokee on U.S. Highway 19 to Soco Gap, 5 miles northwest on the Blue Ridge Parkway to Barnett Knob Fire Tower Road, 500 feet southwest on Barnett Knob Fire Tower Road, 100 feet south of the road, in a wooded area (State plane coordinates 672,000 feet N., 742,000 feet E.):

Oi—1 inch to 0; partly decomposed organic matter, leaves, twigs, and roots.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) channery loam; weak fine granular structure; very friable; many fine and medium roots; 5 percent, by volume, mostly metasandstone flagstones and 15 percent, by volume, phyllite channers; common fine flakes of mica; very strongly acid; clear wavy boundary.

Bw1—4 to 13 inches; strong brown (7.5YR 4/6) fine sandy loam; weak medium subangular blocky structure; friable; 5 percent, by volume, phyllite channers; common fine flakes of mica; strongly acid; clear wavy boundary.

Bw2—13 to 24 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak fine subangular blocky structure; friable; 5 percent, by volume, phyllite channers; few fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—24 to 32 inches; yellowish brown (10YR 5/4) channery fine sandy loam; massive; friable; 20 percent, by volume, weathered phyllite channers; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C—32 to 35 inches; brown (10YR 5/3), gray (10YR 6/1), and black (10YR 2/1) channery fine sandy loam that weathered from saprolite; weak coarse platy rock-controlled structure; friable; 25 percent, by volume, weathered phyllite channers; common fine flakes of mica; very strongly acid; clear wavy boundary.

Cr—35 to 60 inches; multicolored, weathered phyllite; few seams of multicolored fine sandy loam in cracks; partly consolidated but can be dug with difficulty by a spade.

The thickness of the solum ranges from 16 to 39 inches. The depth to a Cr horizon of weathered, fractured bedrock ranges from 20 to 40 inches. The depth to hard bedrock is more than 40 inches. Reaction is extremely acid to strongly acid in unlimed areas. The number of mica flakes is few or common. The content of rock fragments is as much as 35 percent, by volume, in the control section.

The A horizon has hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 2 to 6. Where value is 2 or 3 and chroma is 1 to 3, the horizon is less than 7 inches thick.

The Bw horizon and the BC horizon, if it occurs, have hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. They are loam, fine sandy loam, or silt loam in the fine-earth fraction.

The C horizon, if it occurs, is multicolored saprolite weathered from metasedimentary rocks. It is loam, fine sandy loam, sandy loam, loamy fine sand, or silt loam in the fine-earth fraction.

The Cr horizon is multicolored, weathered metasedimentary rock that is partly consolidated but can be dug with difficulty by a spade.

Spivey Series

These soils are very deep, well drained, and moderately rapidly permeable. They formed in colluvium derived from metasedimentary rocks. They are on toe slopes and benches and along drainageways in coves. Elevation generally ranges from 2,000 to 4,800 feet. Slope ranges from 15 to 50 percent. The soils are

classified as loamy-skeletal, mixed, mesic Typic Haplumbrepts.

Spivey soils are geographically associated with Santeetlah soils, which are coarse-loamy and mixed with areas of the Spivey soils in coves and along toe slopes.

Typical pedon of Spivey flaggy loam, in an area of Spivey-Santeetlah complex, 30 to 50 percent slopes, stony; about 4.3 miles northeast of Wilmot, 1.7 miles east of the confluence of the east and west forks of Dicks Creek on Secondary Road 1389 (State plane coordinates 545,500 feet N., 596,500 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A1—0 to 7 inches; very dark brown (10YR 2/2) flaggy loam; weak fine granular structure; very friable; many fine to coarse roots; 15 percent, by volume, flagstones and 15 percent, by volume, channers; few fine flakes of mica; very strongly acid; clear smooth boundary.

A2—7 to 13 inches; dark brown (10YR 3/3) flaggy loam; weak medium granular structure; very friable; many fine to coarse roots; 20 percent, by volume, flagstones and 10 percent, by volume, channers; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bw1—13 to 18 inches; dark yellowish brown (10YR 4/4) very flaggy loam; weak medium subangular blocky structure; friable; few fine and medium roots; 30 percent, by volume, flagstones and 15 percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bw2—18 to 38 inches; strong brown (7.5YR 4/6) very flaggy fine sandy loam; weak medium subangular blocky structure; friable; few fine and medium roots; 30 percent, by volume, flagstones, 15 percent, by volume, channers, and 5 percent, by volume, stones; common fine flakes of mica; strongly acid; gradual wavy boundary.

BC—38 to 60 inches; yellowish brown (10YR 5/6) very flaggy fine sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; 30 percent, by volume, flagstones, 10 percent, by volume, channers, and 10 percent, by volume, stones; common fine flakes of mica; strongly acid.

The thickness of the solum ranges from 30 to 60 inches or more. The depth to bedrock is more than 60 inches. Reaction is extremely acid to strongly acid in the A horizon in unlimed areas. It ranges from very strongly acid to moderately acid in the Bw horizon and the lower horizons. The number of mica flakes is few or common. The average content of rock fragments ranges from 35 to 70 percent, by volume, in the control section.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. It is loam or fine sandy loam in the fine-earth fraction.

The BC horizon, if it occurs, has colors similar to those in the Bw horizon. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The C horizon, if it occurs, is colluvium that is multicolored or similar in color to the Bw horizon. It is loam, sandy loam, or fine sandy loam in the fine-earth fraction.

Statler Series

These soils are very deep, well drained, and moderately permeable. They formed in old alluvium. They are on low stream terraces. Elevation generally ranges from 1,850 to 2,500 feet. Slope ranges from 1 to 5 percent. The soils are classified as fine-loamy, mixed, mesic Humic Hapludults.

Statler soils are geographically associated with Hemphill and Dillard soils. The associated soils are in depressions on low stream terraces. Hemphill soils are very poorly drained and slowly permeable. Dillard soils are moderately well drained and moderately permeable.

Typical pedon of Statler loam, 1 to 5 percent slopes, rarely flooded; about 1.3 miles north of Qualla on U.S. Highway 441 to the intersection of U.S. Highway 441 and Secondary Road 1406, about 150 feet northeast of Secondary Road 1406, in a field (State plane coordinates 581,100 feet N., 681,600 feet E.):

Ap—0 to 9 inches; dark brown (10YR 3/3) loam; weak fine granular structure; very friable; common fine and medium roots; few fine flakes of mica; slightly acid; clear wavy boundary.

Bt1—9 to 30 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few discontinuous clay films on faces of peds; common fine flakes of mica; moderately acid; gradual wavy boundary.

Bt2—30 to 62 inches; yellowish brown (10YR 5/6) sandy clay loam; few fine prominent yellowish red (5YR 5/6) and common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few discontinuous clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.

BC—62 to 70 inches; strong brown (7.5YR 4/6) fine sandy loam; few fine prominent yellowish red (5YR 5/8) and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular

blocky structure; friable; common fine flakes of mica; strongly acid; gradual wavy boundary.
C—70 to 85 inches; multicolored alluvium that has a texture of fine sandy loam; massive; very friable; common fine flakes of mica; strongly acid.

The thickness of the solum ranges from 30 to 80 inches. Reaction is moderately acid or strongly acid in unlimed areas. In limed areas, reaction is slightly acid to neutral in the A horizon and the upper part of the Bt horizon. The number of mica flakes is few or common. Rock fragments, dominantly of gravel size, are in some horizons in some pedons, but they make up less than 35 percent of the volume.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2 to 4.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. It is loam, sandy clay loam, or clay loam in the fine-earth fraction.

The BC horizon, if it occurs, is similar in color to the Bt horizon. It is fine sandy loam or loam in the fine-earth fraction.

The C horizon, if it occurs, is multicolored alluvium. It is fine sandy loam or loam in the fine-earth fraction.

Stecoah Series

These soils are deep, well drained, and moderately rapidly permeable. They formed in saprolite weathered from metasedimentary rocks. They generally are on ridgetops and south- to west-facing side slopes. Elevation generally ranges from 2,000 to 4,800 feet. Slope ranges from 15 to 95 percent. The soils are classified as coarse-loamy, mixed, mesic Typic Dystrochrepts.

Stecoah soils are geographically associated with Cheoah and Soco soils. Soco soils are moderately deep to weathered bedrock and are intermingled with areas of the Stecoah soils. Cheoah soils are on north- to east-facing slopes and have an umbric epipedon.

Typical pedon of Stecoah channery fine sandy loam, in an area of Soco-Stecoah complex, 30 to 50 percent slopes; 10 miles northeast of Cherokee on U.S. Highway 19 to Soco Gap, 5 miles northwest on the Blue Ridge Parkway to Barnett Knob Fire Tower Road, 700 feet southwest on Barnett Knob Fire Tower Road, 300 feet south of the road, in a wooded area (State plane coordinates 672,000 feet N., 742,000 feet E.):

Oi—1 inch to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.
A—0 to 5 inches; very dark grayish brown (10YR 3/2) channery fine sandy loam; weak fine granular structure; very friable; many fine to coarse roots; 15 percent, by volume, channers and 5 percent, by volume, flagstones; few fine flakes of mica; very strongly acid; clear smooth boundary.
Bw1—5 to 10 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine to coarse roots; 5 percent, by volume, channers; common fine flakes of mica; very strongly acid; gradual wavy boundary.
Bw2—10 to 17 inches; strong brown (7.5YR 4/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; 5 percent, by volume, channers; common fine flakes of mica; very strongly acid; gradual wavy boundary.
Bw3—17 to 22 inches; strong brown (7.5YR 5/8) fine sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; 10 percent, by volume, channers; common fine flakes of mica; very strongly acid; gradual wavy boundary.
Bw4—22 to 36 inches; strong brown (7.5YR 5/6) channery fine sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; 20 percent, by volume, channers; common fine flakes of mica; very strongly acid.
BC—36 to 45 inches; strong brown (7.5YR 5/6) channery fine sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; 25 percent, by volume, channers and 5 percent, by volume, flagstones; common fine flakes of mica; very strongly acid; abrupt irregular boundary.
Cr—45 to 60 inches; multicolored, weathered, interbedded metasandstone and phyllite; few thin seams of strong brown (7.5YR 5/6) fine sandy loam saprolite in rock fractures; black (10YR 2/1) manganese coatings along rock fractures.

The thickness of the solum ranges from 30 to 50 inches. The depth to weathered, fractured bedrock is 40 to 60 inches. The depth to hard bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 35 percent, by volume. Reaction is extremely acid to strongly acid in unlimed areas. The number of mica flakes is few or common.

The A horizon has hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 2 to 6. Where value and chroma are 2 or 3, the horizon is less than 7 inches thick.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is fine sandy loam, silt loam, or loam in the fine-earth fraction.

Some pedons have a BC horizon. This horizon is similar in color and texture to the Bw horizon.

The C horizon, if it occurs, is multicolored saprolite

weathered from metasedimentary rocks. It is sandy loam, fine sandy loam, silt loam, or loam in the fine-earth fraction.

The Cr horizon is multicolored, weathered metasandstone and phyllite.

Sylva Series

These soils are very deep, poorly drained, and moderately rapidly permeable. They formed in colluvium or alluvium derived from high-grade metamorphic rocks. They are on colluvial flats in coves. Elevation generally ranges from 2,500 to 4,800 feet. Slope ranges from 0 to 2 percent. The soils are classified as coarse-loamy, mixed, acid, mesic Humic Haplaquepts.

Sylva soils are geographically associated with Nikwasi, Tuckasegee, and Whiteside soils. Nikwasi soils formed in recent alluvium that is moderately deep to strata of sand, gravel, and cobbles. These soils are subject to flooding. Tuckasegee soils are well drained, and Whiteside soils are moderately well drained. They are mixed with areas of the Sylva soils on nearly level colluvial fans. Whiteside and Tuckasegee soils have an umbric epipedon. Also, Whiteside soils have an argillic horizon and are fine-loamy.

Typical pedon of Sylva loam, in an area of Sylva-Whiteside complex, 0 to 2 percent slopes; 0.25 mile south of Cashiers on Cashiers Lake Road, 0.5 mile west of the intersection of North Carolina Highway 107 and Cashiers Lake Road (State plane coordinates 517,000 feet N., 776,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A1—0 to 4 inches; black (N 2/0) loam; weak medium granular structure; very friable; many fine and medium and few coarse roots; few fine flakes of mica; very strongly acid; clear smooth boundary.

A2—4 to 8 inches; very dark grayish brown (2.5Y 3/2) loam; common medium prominent dark yellowish brown (10YR 4/4) and common medium faint dark grayish brown (2.5Y 4/2) and very dark gray (10YR 3/1) streaks; weak medium subangular blocky structure; friable; common fine and medium roots; common fine flakes of mica; strongly acid; clear irregular boundary.

Bg1—8 to 20 inches; light gray (2.5Y 7/2) loam; weak medium subangular blocky structure; friable; few fine roots; common fine flakes of mica; very strongly acid; gradual wavy boundary.

Bg2—20 to 37 inches; light gray (2.5Y 7/2) sandy loam; weak medium subangular blocky structure; friable; few medium roots; common fine flakes of mica; very strongly acid; gradual wavy boundary.

Cg—37 to 65 inches; light brownish gray (2.5Y 6/2) loam; massive; friable; common fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 22 to 40 inches. The depth to bedrock is more than 60 inches. Reaction is extremely acid to strongly acid in unlimed areas. The number of mica flakes ranges from few to many. The content of rock fragments, mainly gravel, is as much as 15 percent, by volume.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3, or it is neutral in hue and has value of 2 or 3.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 6. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction. In some pedons, it has thin layers, lenses, or pockets of silty clay loam, sandy clay loam, or loamy sand.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It is sandy loam, fine sandy loam, loam, loamy sand, or loamy fine sand. In some pedons, it has thin layers of silty clay loam, sandy clay loam, or clay loam.

Tanasee Series

These soils are very deep, well drained, and moderately rapidly permeable. They formed in colluvium derived from high-grade metamorphic rocks. They are in coves and gaps. Elevation is generally above 4,800 feet. Slope ranges from 8 to 50 percent. The soils are classified as coarse-loamy, mixed, frigid Typic Haplumbrepts.

Tanasee soils are geographically associated with Balsam soils, which are loamy-skeletal and are mixed with areas of the Tanasee soils in coves and gaps.

Typical pedon of Tanasee sandy loam, in an area of Tanasee-Balsam complex, 15 to 30 percent slopes, stony; about 15 miles south of Waynesville on U.S. Highway 276 and North Carolina Highway 215, about 6.2 miles northeast along the Blue Ridge Parkway from its intersection with North Carolina Highway 215, about 150 feet southwest of the Blue Ridge Parkway at Reinhart Gap (State plane coordinates 810,000 feet N., 590,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A1—0 to 7 inches; black (10YR 2/1) sandy loam; weak fine and medium granular structure; very friable; many fine to coarse roots; 8 percent, by volume, rock fragments, mainly cobbles; few fine flakes of mica; extremely acid; gradual wavy boundary.

A2—7 to 13 inches; very dark brown (10YR 2/2) sandy

loam; weak fine and medium granular structure; very friable; common fine to coarse roots; 8 percent, by volume, rock fragments, mainly cobbles; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bw—13 to 31 inches; yellowish brown (10YR 5/8) sandy loam; weak fine and medium subangular blocky structure; very friable; common fine to coarse roots; 14 percent, by volume, rock fragments, mainly cobbles; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C1—31 to 51 inches; dark yellowish brown (10YR 4/6) cobbly loamy coarse sand; massive; very friable; few fine and medium roots; 30 percent, by volume, rock fragments, mainly cobbles and gravel and a few stones; common fine and medium flakes of mica; very strongly acid; gradual wavy boundary.

C2—51 to 65 inches; multicolored gravelly loamy sand that weathered from saprolite; massive; very friable; 16 percent, by volume, rock fragments, mainly gravel and a few cobbles; common fine and medium flakes of mica; very strongly acid.

The thickness of the solum ranges from 24 to 50 inches. The depth to bedrock is more than 60 inches. Reaction is extremely acid to strongly acid. The number of mica flakes is few or common. The content of rock fragments is as much as 35 percent, by volume, in the upper 40 inches and as much as 60 percent, by volume, below a depth of 40 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3 or has hue of 7.5YR, value of 2 or 3, and chroma of 0 to 2.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is fine sandy loam, loam, or sandy loam in the fine-earth fraction.

The C horizon varies in color and consists of loamy or sandy colluvium derived from high-grade metamorphic rocks.

Trimont Series

These soils are very deep, well drained, and moderately permeable (fig. 23). They formed in saprolite weathered from high-grade metamorphic rocks. They are generally on north- to east-facing side slopes. Elevation generally ranges from 2,000 to 3,500 feet. Slope ranges from 30 to 95 percent. The soils are classified as fine-loamy, mixed, mesic Humic Hapludults.

Trimont soils are geographically associated with Cowee, Evard, and Saunook soils. Cowee and Evard soils are not in the Humic Hapludult subgroup and are generally on south- to west-facing side slopes. Also, Cowee soils are moderately deep to weathered bedrock. Saunook soils formed on benches or toe slopes in coves.

Typical pedon of Trimont gravelly loam, 50 to 95 percent slopes, stony; about 0.25 mile south of Sylva on Buck Mountain, 800 feet southeast of the Sylva television relay tower (State plane coordinates 620,000 feet N., 740,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A1—0 to 3 inches; dark brown (7.5YR 3/2) gravelly loam; weak fine granular structure; very friable; many fine and medium and common coarse roots; 15 percent, by volume, gravel and 3 percent, by volume, cobbles; common fine flakes of mica; strongly acid; clear wavy boundary.

A2—3 to 10 inches; dark brown (7.5YR 3/4) gravelly loam; weak fine granular structure; very friable; common fine and medium and few coarse roots; 12 percent, by volume, gravel and 3 percent, by volume, cobbles; common fine flakes of mica; strongly acid; clear wavy boundary.

Bt1—10 to 17 inches; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable; common fine and medium roots; few discontinuous clay films on faces of peds; 10 percent, by volume, gravel; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—17 to 40 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; few discontinuous clay films on faces of peds; 10 percent, by volume, gravel; common fine flakes of mica; moderately acid; gradual wavy boundary.

BC—40 to 65 inches; yellowish red (5YR 5/6) loam; weak medium subangular blocky structure; friable; few fine and medium roots; 10 percent, by volume, gravel; common fine flakes of mica; common distinct black (10YR 2/1) manganese stains; moderately acid.

The thickness of the solum is 30 to more than 60 inches. The depth to hard bedrock is more than 60 inches. Reaction is very strongly acid to moderately acid in unlimed areas. The number of mica flakes is few or common. The content of rock fragments ranges from 0 to 35 percent, by volume.

The A horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 2 to 4. However, no combination of value, chroma, and thickness can qualify for an umbric epipedon.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is loam, sandy clay loam, or clay loam in the fine-earth fraction.

The BC horizon has colors similar to those of the Bt

horizon. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The C horizon, if it occurs, is multicolored saprolite weathered from high-grade metamorphic rocks. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

Tsali Series

These soils are shallow, well drained, and moderately permeable (fig. 24). They formed in saprolite weathered from metasedimentary rocks, especially phyllite. They are generally on ridgetops and south- to west-facing side slopes. Elevation generally ranges from 1,900 to 3,500 feet. Slope ranges from 15 to 95 percent. The soils are classified as loamy, mixed, mesic, shallow Typic Hapludults.

Tsali soils are geographically associated with Brasstown and Junaluska soils. Brasstown soils are deep to weathered bedrock and are on concave head slopes. Junaluska soils are moderately deep to weathered bedrock and are intermingled with areas of the Tsali soils.

Typical pedon of Tsali channery fine sandy loam, in an area of Junaluska-Tsali complex, 50 to 95 percent slopes; about 3.8 miles northwest of Dillsboro on U.S. Highway 441, about 0.5 mile northeast of the intersection of U.S. Highway 441 and the access road to the Smoky Mountain Mental Health Center, 600 feet west of the woodworking shop at the center (State plane coordinates 630,000 feet N., 723,000 feet E.):

Oi—3 inches to 0; partly decomposed pine needles, twigs, roots, and other plant material.

A—0 to 3 inches; dark brown (10YR 4/3) channery fine sandy loam; weak fine granular structure; very friable; many fine to coarse roots; 20 percent, by volume, channers; common fine flakes of mica; very strongly acid; clear wavy boundary.

BA—3 to 6 inches; brown (7.5YR 4/4) channery fine sandy loam; weak fine subangular blocky structure; friable; many fine to coarse roots; 20 percent, by volume, channers; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bt—6 to 16 inches; yellowish red (5YR 5/8) channery loam; weak medium subangular blocky structure; friable; common fine and medium roots; few discontinuous clay films on faces of peds; 25 percent, by volume, channers; common fine and medium flakes of mica; strongly acid; clear irregular boundary.

Cr—16 to 40 inches; multicolored, weathered, fractured phyllite; few thin seams of yellowish red (5YR 5/8) loam in rock fractures.

The thickness of the solum ranges from 12 to 19 inches. The depth to weathered bedrock is 12 to 20 inches. The depth to hard bedrock is more than 30 inches. Reaction is extremely acid to strongly acid. The number of mica flakes is few or common. The content of rock fragments, dominantly of channer size, ranges from 15 to 35 percent, by volume.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 8. Where value is 3 and chroma is 3 or 4, the horizon is less than 6 inches thick.

The BA horizon, if it occurs, has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is fine sandy loam or loam in the fine-earth fraction.

The Bt horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is loam, sandy clay loam, or clay loam in the fine-earth fraction.

The Cr horizon is multicolored, weathered, fractured metasedimentary rocks, especially phyllite, that are partly consolidated.

Tuckasegee Series

These soils are very deep, well drained, and moderately rapidly permeable (fig. 25). They formed in colluvium derived from high-grade metamorphic rocks. They are on benches and toe slopes in coves. Elevation generally ranges from 3,500 to 4,800 feet. Slope ranges from 2 to 90 percent. The soils are classified as fine-loamy, mixed, mesic Typic Haplumbrepts.

Tuckasegee soils are geographically associated with Cullasaja and Whiteside soils. The associated soils are mixed with areas of the Tuckasegee soils in coves and on benches and toe slopes. Cullasaja soils are loamy-skeletal. Whiteside soils are moderately well drained.

Typical pedon of Tuckasegee gravelly loam, in an area of Cullasaja-Tuckasegee complex, 30 to 50 percent slopes, stony; about 5 miles northeast of Cullowhee near the headwaters of Moses Creek at Jackie Spring Gap, 700 feet west of a U.S. Forest Service access road (State plane coordinates 604,000 feet N., 782,000 feet E.):

Oi—2 inches to 0; partly decomposed leaves, twigs, roots, and other deciduous plant material.

A—0 to 11 inches; very dark brown (10YR 2/2) gravelly loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bw1—11 to 16 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; common fine and medium roots; 10 percent, by volume, gravel; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bw2—16 to 24 inches; dark yellowish brown (10YR 4/4) gravelly loam; weak medium subangular blocky structure; friable; few fine and medium roots; 15 percent, by volume, gravel and 2 percent, by volume, cobbles; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bw3—24 to 44 inches; yellowish brown (10YR 5/8) gravelly fine sandy loam; weak medium subangular blocky structure; friable; few fine and medium roots; 15 percent, by volume, gravel and 5 percent, by volume, cobbles; common fine flakes of mica; strongly acid; gradual wavy boundary.

BC—44 to 60 inches; yellowish brown (10YR 5/8) gravelly sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; 20 percent, by volume, gravel and 5 percent, by volume, cobbles; common fine flakes of mica; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to bedrock is more than 72 inches. Reaction is very strongly acid to moderately acid in unlimed areas. The number of mica flakes is few or common. The content of rock fragments is as much as 35 percent, by volume, in the upper 40 inches and as much as 60 percent, by volume, below a depth of 40 inches.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3.

Some pedons have an AB horizon. This horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4 but does not meet the color requirements for an umbric epipedon. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 4 to 8. It is fine sandy loam, loam, sandy loam, or sandy clay loam in the fine-earth fraction.

The BC horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is fine sandy loam, sandy loam, sandy clay loam, or loam in the fine-earth fraction.

The C horizon, if it occurs, is colluvium derived from high-grade metamorphic rocks. It is similar in color to the BC horizon or is multicolored. It is fine sandy loam, loam, sandy loam, coarse sandy loam, loamy fine sand, loamy sand, or loamy coarse sand in the fine-earth fraction.

Udorthents

Udorthents consists of areas where the natural soil has been altered by excavation or covered by earthy fill material. These areas are well drained or moderately well drained. The excavated areas are mainly borrow pits from which the soil has been removed and used as foundation material for roads and buildings.

In most excavated areas, the exposed material is sandy loam, loamy sand, or loam. The fill areas are sites where at least 20 inches of loamy, earthy material covers borrow pits, landfills, natural drainageways, or low-lying areas. Slope ranges from nearly level to very steep, and some areas are undulating.

A typical pedon is not given for these soils because they vary. The depth to bedrock varies greatly. The fill areas are more than 20 inches deep and are as much as 100 feet deep in some areas. Landfills have layers of nonsoil material covered by loamy soil material.

The Udorthents have colors in shades of red, brown, yellow, and gray. The texture varies but typically is loamy. Reaction ranges from extremely acid to slightly acid.

Wayah Series

These soils are very deep, well drained, and moderately rapidly permeable. They formed in saprolite weathered from high-grade metamorphic rocks. They are on ridges and side slopes. Elevation is generally above 4,800 feet. Slope ranges from 8 to 95 percent. The soils are classified as coarse-loamy, mixed, frigid Typic Haplumbrepts.

Wayah soils are geographically associated with Burton and Craggey soils. The associated soils are on narrow ridgetops or side slopes near areas of rock outcrop. Burton soils are moderately deep to bedrock, and Craggey soils are shallow to bedrock.

Typical pedon of Wayah sandy loam, 15 to 30 percent slopes, stony; 10 miles northeast of Cullowhee along the Blue Ridge Parkway to the Richland Balsam Exhibit, 200 feet west of the parkway, in a wooded area (State plane coordinates 800,000 feet N., 630,000 feet E.):

Oi—4 to 2 inches; slightly decomposed needles and twigs.

Oe—2 inches to 0; partly decomposed organic litter and root mat.

A1—0 to 10 inches; black (10YR 2/1) sandy loam; weak fine granular structure; very friable; common fine and medium roots; 2 percent, by volume, gravel; few fine flakes of mica; 18 percent organic matter; extremely acid; clear wavy boundary.

A2—10 to 14 inches; very dark grayish brown (10YR 3/2) sandy loam; weak medium granular structure; very friable; common fine and medium roots; 2 percent, by volume, gravel; few fine flakes of mica; 7 percent organic matter; very strongly acid; clear wavy boundary.

Bw—14 to 40 inches; dark yellowish brown (10YR 4/6)

gravelly sandy loam; weak medium subangular blocky structure; very friable; few fine roots; 33 percent, by volume, gravel; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C1—40 to 46 inches; pale brown (10YR 6/3) gravelly sandy loam that weathered from gneiss saprolite; few medium faint light gray (10YR 7/2) and white (10YR 8/2) mottles; massive rock-controlled structure; very friable; 16 percent, by volume, gravel; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C2—46 to 65 inches; mottled yellowish brown (10YR 5/8), yellowish red (5YR 5/6), white (10YR 8/2), and pale brown (10YR 6/3) gravelly sandy loam that weathered from gneiss saprolite; massive rock-controlled structure; very friable; 17 percent, by volume, gravel; few fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 20 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments is as much as 35 percent, by volume. Reaction is extremely acid to strongly acid. The number of mica flakes is few or common.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The BC horizon, if it occurs, is similar in color and texture to the Bw horizon.

The C horizon is multicolored saprolite weathered from high-grade metamorphic rocks. It is fine sandy loam, sandy loam, coarse sandy loam, or loamy sand in the fine-earth fraction.

Whiteside Series

These soils are very deep, moderately well drained, and moderately permeable. They formed in colluvium derived from high-grade metamorphic rocks. They are on colluvial flats and toe slopes in coves. Elevation generally ranges from 2,500 to 4,800 feet. Slope ranges from 1 to 15 percent. The soils are classified as fine-loamy, mixed, mesic Aquic Hapludults.

Whiteside soils are geographically associated with Sylva and Tuckasegee soils. Tuckasegee soils are well drained and are on elevated knolls. Sylva soils are poorly drained and are in nearly level depressions. Also, Sylva soils are coarse-loamy.

Typical pedon of Whiteside fine sandy loam, in an area of Whiteside-Tuckasegee complex, 2 to 8 percent slopes; 7.3 miles south of Speedwell on Secondary Road 1157 to Double Spring Church, 300 feet northwest of Secondary Road 1157, in a field (State plane coordinates 517,000 feet N., 776,000 feet E.):

Ap—0 to 14 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; 10 percent, by volume, gravel; common fine flakes of mica; slightly acid; abrupt smooth boundary.

Bt1—14 to 24 inches; yellowish brown (10YR 5/6) sandy clay loam; common streaks of very dark grayish brown (10YR 3/2) in old root channels; weak medium subangular blocky structure; very friable; few fine roots; common fine flakes of mica; slightly acid; clear wavy boundary.

Bt2—24 to 30 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) and gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine flakes of mica; moderately acid; clear wavy boundary.

BCg—30 to 47 inches; gray (10YR 6/1) fine sandy loam; common medium distinct yellowish brown (10YR 5/8) and common medium faint gray (10YR 5/1) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine to coarse flakes of mica; moderately acid; gradual wavy boundary.

Cg1—47 to 53 inches; light brownish gray (10YR 6/2) sandy loam; common medium distinct brownish yellow (10YR 6/6) mottles; massive; very friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Cg2—53 to 70 inches; gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; common thin lenses and pockets of light brownish gray (10YR 6/2) loamy sand; massive; firm; few fine flakes of mica; strongly acid.

The thickness of the solum ranges from 30 to 60 inches. The depth to bedrock is more than 72 inches. Reaction is very strongly acid to moderately acid in unlimed areas. The number of mica flakes ranges from few to many. The content of rock fragments, mainly gravel, is typically 0 to 15 percent, by volume, but ranges to as much as 35 percent, by volume, in some pedons.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. It is mottled in chroma of 2 or less within 24 inches of the upper boundary of the horizon. It is loam, sandy clay loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The BCg horizon, if it occurs, has hue of 10YR or

2.5Y, value of 4 to 7, and chroma of 1 or 2. The BC horizon, if it occurs, is similar in color to the Bt horizon. The BCg and BC horizons are loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The Cg horizon and the C horizon, if it occurs, are colluvium or alluvium that is similar in color to the BCg and BC horizons, respectively. They vary in texture, ranging from sandy clay loam to loamy sand in the fine-earth fraction. The sandy textures, if they occur, are below a depth of 40 inches.

Formation of the Soils

Soils are formed by processes of the environment acting on geologic parent material. In Jackson County, the major geologic materials are high-grade, metamorphic, metasedimentary, and ultramafic rocks and the colluvium and alluvium derived from these rocks. The characteristics of a soil are determined by the combined influence of parent material, climate, plant and animal life, relief, and time. These five factors are responsible for the profile development and chemical properties that differentiate soils *(6)*.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. In Jackson County, parent material is a major factor in determining what kind of soil forms and it can be correlated to some degree to geologic formations. The general soil map is an approximate guide to the geology of the county.

The soils in the Evard-Cowee-Saunook-Trimont, Plott-Edneyville-Chestnut-Cullasaja, Cleveland-Rock outcrop-Chestnut, Whiteside-Tuckasegee-Nikwasi, and Wayah general soil map units formed in material weathered from high-grade metamorphic rocks, such as hornblende gneiss, gneiss, and mica gneiss. The soils in the Junaluska-Brasstown-Tsali, Soco-Stecoah-Cheoah, and Oconaluftee general soil map units formed in material weathered from metasedimentary rocks, such as metasandstone, phyllite, and slate. The soils in the Ellijay general soil map unit formed in material weathered from ultramafic rocks, such as dunite. The soils in the Chandler-Fannin-Cashiers general soil map unit formed in material weathered from high-grade metamorphic rocks that are very high in content of mica, such as mica schist and mica gneiss. The soils in the Braddock-Nikwasi-Dellwood-Cullowhee general soil map unit formed in alluvium deposited by streams.

Climate

Climatic factors, particularly precipitation and temperature, affect the physical, chemical, and biological relationships of soil horizons. They influence the rates at which rocks weather and organic matter decomposes. The amount of leaching in a soil is related to the amount of rainfall and the movement of water through the soil. The effects of climate also control the kinds of plants and animals that can thrive in a region. Temperature influences the kinds of organisms in a region and their growth. It also influences the speed of chemical and physical reactions in the soil.

In Jackson County, the climate varies greatly in relation to elevation and landscape position. For example, annual rainfall varies significantly in the county. It averages from about 50 inches near the town of Cullowhee to 100 inches south of Cashiers. In some areas that have a high amount of rainfall, the rate of precipitation may exceed the rate of evapotranspiration in every month of most years. Localized microclimates are important in the soil-forming processes in the county. The climate at any single place is influenced by elevation, aspect, and location to the moisture-rich winds from the Gulf of Mexico.

The higher rainfall and cooler temperatures in the high mountains produce brown, medium textured soils that have a high content of organic matter in the surface layer. The warmer temperatures in the low mountains produce soils that are redder than those in the high mountains and that contain more clay in the subsoil.

Plant and Animal Life

Plants and animals influence the formation and differentiation of soil horizons. The kind and number of organisms in and on the soil are determined partly by climate and partly by the nature of the soil material, the relief, and the age of the soil. Bacteria, fungi, and other micro-organisms aid in the weathering of rocks and in the decomposition of organic matter. The plants and animals that live on a soil are the primary source of organic material.

Plants generally determine the kinds and amounts of organic matter that enter a soil under normal conditions and how the organic matter is added. They also concentrate readily available forms of essential elements in the surface through the nutrient cycle.

Generally, the soils in Jackson County formed under a hardwood forest. Trees take up elements from the subsoil. They add organic matter to the surface layer by

depositing leaves, roots, twigs, and eventually branches and trunks. The material is then acted on by organisms and undergoes chemical reactions. In the county, plants do not bring enough base material to the surface layer to counteract the effects of acidification.

Animals convert complex compounds into simpler forms, add organic material to the soil, and modify certain chemical and physical properties. In the county, most of the organic material accumulates on the surface. It is acted on by micro-organisms, fungi, earthworms, and other forms of life and by direct chemical reaction. It is then mixed with the uppermost mineral part of the soil by the activities of earthworms and other small invertebrates.

Generally, organic material decomposes more rapidly in the soils in the low mountains that have moderate temperatures and direct sunlight. Although organic matter is produced more rapidly in these soils, a lower content is present than in those soils at cooler, higher elevations because the soils in high mountains or on aspects shaded from direct sunlight can maintain a high content of organic matter in their surface layer.

Relief

Relief influences drainage, surface runoff, temperature, and the extent of geologic erosion. In Jackson County, relief varies greatly. Slopes range from 0 to 95 percent in the county.

Steeply sloping relief increases runoff and thus reduces percolation of water through the soil. Relief can also affect drainage. For example, a high water table generally is related to nearly level or gently sloping soils. Alluvial and colluvial soils are commonly less sloping than soils in the uplands. They receive runoff from the surrounding uplands. Examples are Dellwood and Saunook soils.

Soil creep is an important factor affecting soil formation in mountainous areas. Generally, the upper part of most of the soils on side slopes formed in material that is slowly moving downslope from the higher areas. Soils that formed on ridgetops and shoulder slopes are much less affected by soil creep. These areas may be the only landscape positions where the soils are completely residual. Generally, soil depth increases downslope, especially on concave surfaces. The maximum soil thickness is on colluvial landscape positions in coves and along toe slopes.

Time

The length of time that soil material has been exposed to the soil-forming processes accounts for some differences in the formation of the soils. The formation of a well defined soil profile, however, depends on other factors. Less time is required for a soil profile to develop in a warm climate than in a cool climate.

The soils in Jackson County vary considerably in age. The length of the time that a soil has been forming is reflected in the profile. Old soils generally have more clay movement and accumulation in their horizons than young soils. In the county, the effects of time as a soil-forming factor are more apparent in the older soils, such as Braddock soils, which are on the broader parts of high stream terraces. Young soils along streams, such as Reddies and Rosman soils, have more sand and may be underlain by strata of sand, gravel, and cobbles. Other soils in the county, such as Cullasaja soils, are considered young because of their landscape position. Cullasaja soils are not well developed because they are on strongly sloping to very steep landscapes and are receiving material from geologic erosion.

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Glossary

Access road. A road constructed to facilitate the use and management of the land. Access roads are designed for limited traffic and typically consist of a cut slope, a roadbed, and a fill outslope.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquifer. A water-bearing bed or stratum of permeable rock, sand, or gravel capable of fielding considerable quantities of water to wells or springs.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Aspect. The direction in which a slope faces. Generally, cool aspects are north- and east-facing and warm aspects are south- and west-facing.

Atterberg limits. Atterberg limits are measured for soil materials passing the No. 40 sieve. They include the liquid limit (LL), which is the moisture content at which the soil passes from a plastic to a liquid state, and the plastic limit (PL), which is the water content corresponding to an arbitrary limit between the plastic and semisolid states of consistency of a soil.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Bald. A grass and shrub covered summit or other elevated area that is naturally bare of forests.

Balled and burlapped. A method of harvesting nursery plants in which burlap is wrapped around a ball of soil that is attached to the root system.

Bare-root harvested. A method of harvesting in which nursery plants are removed from the soil with their roots bare and are packed in moist shipping material.

Basal area. The cross-sectional area of a tree bole measured at 4.5 feet above ground level. It is usually expressed in square feet of cross-sectional area per acre.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Basic rock. An igneous rock composed dominantly of dark minerals. The minerals of this rock are comparatively low in silica and rich in bases, such as the amphiboles, the pyroxenes, biotite, or olivine.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Benchmark soil. A soil of large extent that holds a key position in the soil classification system or is of special significance to farming, engineering, forestry, or other uses.

Biotite. A common rock-forming mineral consisting primarily of ferromagnesian silicate minerals. Color

ranges from dark brown to green in thin section. Biotite is commonly referred to as "black mica" because of the natural black color.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Broad-based dips. Short sections of access road having a reverse grade to intercept storm water and divert it off the roadbed. Dips are spaced about 200 feet apart and placed to divert water away from stream crossings or steep grades.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve a drum, pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are yarded or reeled in while one end is lifted or the entire log is completely suspended.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channel flow. Storm waters from roads, roofs, parking lots, and other impervious surfaces flowing into intermittent drainageways during and after heavy rainfall.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of metasandstone, phyllite, or slate as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey. A general textural term that includes sandy clay, silty clay, and clay. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) containing 35 percent or more clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Clod. See Aggregate, soil.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse-loamy. According to family level criteria in the soil taxonomic system, soil containing less than 18 percent, by weight, clay and 15 or more percent fine sand or coarser material.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvial fan. A fan-shaped area of soils deposited by mass-wasting (direct gravitational action) and local unconcentrated runoff on and at the base of steeper side slopes.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour farming. A system of planting crops on the natural contour of the land that provides slope breaks to slow runoff. For example, planting crops in rows perpendicular to the slope instead of up and down the slope.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cove. Gently sloping to very steep, concave colluvial areas commonly located at the head of or along drainageways in mountainous areas. Coves are long and narrow along drainageways extending up into the mountains and become wide and bowl shaped as streams flow out of the mountains down into the valleys.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Use of that portion of the plant or crop left in the field after harvest for protection or improvement of the soil.

Crust. A thin, hard layer of soil material that forms on the surface of cultivated areas as the result of fine soil material settling out of ponding.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dbh (diameter at breast height). The diameter of a tree at 4.5 feet above the ground level on the uphill side.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delineation. The process of drawing or plotting features on a map with lines and symbols.

Denitrification. The biochemical reduction of nitrate or nitrite to gaseous nitrogen either as molecular nitrogen or as an oxide of nitrogen.

Depth class. Refers to the depth to a root-restricting layer. Unless otherwise stated, this layer is understood to be consolidated bedrock. The depth classes in this survey are:

Very shallow	less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 40 inches
Deep	40 to 60 inches
Very deep	more than 60 inches

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but

periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. A narrow, gently sloping to very steep, concave colluvial area along an intermittent or perennial stream.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Engineering index test data. Laboratory test and mechanical analysis of selected soils in the county.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Erosion classes. Classes based on estimates of past erosion. The classes are as follows:

Class 1.—Soils that have lost some of the original A horizon but on the average less than 25 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most of the area, the thickness of the surface layer is within the normal range of variability of the uneroded soil. Class 1 erosion typically is not designated in the name of the map unit or in the map symbol.

Class 2.—Soils that have lost an average of 25 to 75 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most cultivated areas of class 2 erosion, the surface layer consists of a mixture of the original A horizon and material from below. Some areas may have intricate patterns ranging from uneroded spots to spots where all of the original A horizon has been removed.

Class 3.—Soils that have lost an average of 75 percent or more of the original A horizon or the uppermost 8 inches (if the original A horizon was less than 8 inches thick). In most cultivated areas of class 3 erosion, material that was below the original A horizon is exposed at the surface. The plow layer consists entirely or largely of this material.

Class 4.—Soils that have lost all of the original A horizon or the uppermost 8 inches (if the original A horizon was less than 8 inches thick) plus some or all of the deeper horizons throughout most of the area. The original soil can be identified only in spots. Some areas may be smooth, but most have an intricate pattern of gullies.

Erosion hazard. Terms describing the potential for future erosion, inherent in the soil itself, in inadequately protected areas. The following definitions are based on estimated annual soil loss in tons per acre (values determined by the Universal Soil Loss Equation assuming bare soil conditions and using rainfall and climate factors for North Carolina):

0 tons per acre	none
Less than 1 ton per acre	slight

1 to 5 tons per acre	moderate
5 to 10 tons per acre	severe
More than 10 tons per acre	very severe

Evapotranspiration. The combined loss of water from a given area through surface evaporation and through transpiration by plants during a specified period.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

Fault. A surface of rock rupture along which there has been differential movement.

Felsic rock. A general term for light-colored igneous rock and some metamorphic crystalline rock.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fill slope. A sloping surface made by excavating soil material from the road cut. It commonly is on the downhill side of the road.

Fine-loamy. According to family level criteria in the soil taxonomic system, soil containing 18 to 35 percent, by weight, clay and 15 or more percent fine sand or coarser material.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flooding. The temporary covering of the soil surface by flowing water from any source, such as overflowing streams, runoff from adjacent or surrounding slopes, and inflow from high tides. The frequency of flooding generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). The duration of flooding is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month).

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant that is not a grass or a sedge.

Forest type. A classification of forest land based on the species forming the majority of live-tree stocking.

Fragile (in tables). The soil is easily damaged by use or disturbance.

Frost action (in tables). Freezing and thawing of soil moisture can damage roads, buildings and other structures, and plant roots.

Gap. A concave, lower-lying area between ridge crests that generally has lesser slope.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Gneiss. A coarse grained metamorphic rock in which bands rich in granular minerals alternate with bands in which schistose minerals predominate. It is commonly formed by the metamorphism of granite.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Granite. A coarse grained igneous rock dominated by light-colored minerals, consisting of about 50 percent orthoclase and 25 percent quartz with the balance being plagioclase feldspars and ferromagnesian silicates. Granites and granodiorites comprise 95 percent of all intrusive rocks.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3

inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Head slope. A concave, horseshoe-shaped slope on a mountain landscape at the beginning of an intermittent drainageway.

High-grade metamorphic rocks. Highly metamorphosed rocks, such as gneiss and schist.

High mountains. The part of the landscape that is above an elevation of about 4,800 feet. It is dominated by frigid soil temperatures.

High stream terrace. A terrace, commonly 20 feet or higher in elevation than the adjacent flood plain, that is no longer subject to flooding.

High sulfur-bearing rock. Any rock rich in pyrite (iron disulfide).

High-value crop. Crops, such as tobacco, cabbage, and tomatoes, that require a high level of management, are labor intensive, and have a potential high profit per acre.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hornblende. A rock-forming ferromagnesian silicate mineral of the amphibole group.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Hydroseeding. A method of applying seed, fertilizer, and mulch to steep areas by mixing those

ingredients with water and spraying the slurry under pressure from a truck.

Igneous rock. Rock formed by solidification of molten rock, generally crystalline in nature.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermediate mountains. The part of the landscape that ranges from about 3,500 to 4,800 feet in elevation. It is dominated by mesic soil temperatures.

Intermediate rock. Igneous or metamorphic crystalline rock that is intermediate in composition between mafic and felsic rock.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Landscape. A section or portion of the land. Examples are high, intermediate, and low mountains; low, rolling hills; and flood plains. Parts of a landscape include side slopes, back slopes, toe slopes, foot slopes, ridgetops, ridge noses, and spur or finger ridges.

Landscape position. A particular location on the landscape. Examples are the summit of a ridge, shoulder of a ridge, ridge nose, side slope, back slope, toe slope, foot slope, cove, and drainageway.

Land shaping. The practice of scraping higher convex areas into lower concave areas to make the field nearly level and reduce ponding.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. A general textural term that includes coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of loamy very fine sand or finer textured material that contains less than 35 percent clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Low mountains. The part of the landscape that ranges from about 2,500 to 3,500 feet in elevation. It is dominated by mesic soil temperatures.

Low stream terrace. A terrace in an area that floods, commonly 3 to 10 feet higher in elevation than the adjacent flood plain.

Low strength. The soil is not strong enough to support loads.

Mafic rock. A dark rock composed predominantly of

magnesium silicates. It contains little quartz, feldspar, or muscovite mica.

Mean annual increment. The average yearly volume of a stand of trees from the year of origin to the age under consideration.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Metasedimentary rock. Metamorphosed sedimentary rocks, such as phyllite, metasandstone, and slate.

Metasediments. Parent material derived from metasedimentary rocks.

Micas. A group of silicate minerals characterized by sheet or scale cleavage. Biotite is the ferromagnesian black mica. Muscovite is the potassic white mica.

Microrelief. The concave to convex changes in the land surface occurring over a relatively short distance or small area, such as 1 acre.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Muscovite. A nonferromagnesian rock-forming silicate mineral with its tetrahedra arranged in sheets. Commonly called "white mica" and sometimes called potassic mica.

Native pasture. Pasture that has seeded naturally in native grasses. It is normally on slopes of more than 30 percent, which are too steep to manage with modern machinery.

Natural soil. Soil material or saprolite that is in place and is not fill.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nose slope. The downward-sloping convex end of a main ridge or spur ridge.

No-till planting. A method of planting crops in which there is virtually no seedbed preparation. A thin slice of the soil is opened, and the seed is planted at the desired depth.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Out-sloping roads. Placing a slight tilt to a roadbed so that water flows off the downhill side.

Overstory. The portion of the trees in a forest stand forming the upper crown cover.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Pegmatite. A small pluton of exceptionally coarse texture, commonly formed at the margin of a batholith characterized by graphic structure. Nearly 90 percent of all pegmatites are simple pegmatites of quartz, orthoclase, and unimportant percentages of micas.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is

measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential natural plant community. The total plant community that is best adapted to the combination of environmental factors and is in dynamic equilibrium with the environment.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	below 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Reforestation. The process in which tree seedlings are planted or become naturally established in an area that was once forested.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Ridge. See Ridgetop.

Ridge nose. The landscape position that is the terminal point of a ridge or a spur ridge.

Ridgetop. The landscape position that is the crest of a hill or mountain.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Runoff class (surface). Refers to the rate at which water flows away from the soil over the surface without infiltrating. Six classes of rate of runoff are recognized:

Ponded.—Little of the precipitation and water that runs onto the soil escapes as runoff, and free water stands on the surface for significant periods. The amount of water that is removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs on level and

nearly level soils in depressions. The water depth may fluctuate greatly.

Very slow.—Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. The soils are commonly level or nearly level or are very porous.

Slow.—Surface water flows away so slowly that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. The soils are nearly level or very gently sloping, or they are steeper but absorb precipitation very rapidly.

Medium.—Surface water flows away so rapidly that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. The soils are nearly level or gently sloping and absorb precipitation at a moderate rate, or they are steeper but absorb water rapidly.

Rapid.—Surface water flows away so rapidly that the period of concentration is brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly moderately steep or steep and have moderate or slow rates of absorption.

Very rapid.—Surface water flows away so rapidly that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly steep or very steep and absorb precipitation slowly.

Saddle. A localized concave dip in a main ridge where intermittent drainage starts to form on the adjacent side slope.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandy. A general textural term that includes coarse sand, sand, fine sand, very fine sand, loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of sand or loamy sand that contains less than 50 percent very fine sand, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Saprolite instability. A property of highly micaceous saprolite that makes it very susceptible to piping, erosion, slumping, and failure to support loads.

Schist. A metamorphic rock dominated by fibrous or platy minerals. It has schistose cleavage and is a product of regional metamorphism.

Seasonal high water table. The highest level of a saturated zone in the apparent water table over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Seep. A small area on the landscape where water oozes through the soil and causes the surface to remain wet. The water does not flow on the surface.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The landscape position, parallel to the summit, that is just below the ridgetop and just above the side slope.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. The landscape position that is just below the shoulder and just above the toe slope, occupying most of the mountainside or hillside.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Skidding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most systems involve pulling the trees with wire cables attached to a bulldozer or rubber-tired tractor. Generally, felled trees are skidded or

pulled with one end lifted to reduce friction and soil disturbance.

Skid trails. The paths left from skidding logs and the bulldozer or tractor used to pull them.

Slate. A fine grained metamorphic rock with well developed slaty cleavage. Formed by the low-grade regional metamorphism of shale.

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey area slope classes are as follows:

Nearly level	0 to 3 percent
Gently sloping	1 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 30 percent
Steep	30 to 50 percent
Very steep	50 to 95 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil compaction. An alteration of soil structure that ultimately can affect the biological and chemical properties of the soil. Compaction decreases the extent of voids and increases bulk density.

Soil creep. The slow mass movement of soil and soil materials downslope, primarily under the influence of gravity, facilitated by water saturation and by alternating freezing and thawing.

Soil map unit. A kind of soil or miscellaneous area or a combination of two or more soils or one or more soils and one or more miscellaneous areas that can be shown at the scale of mapping for the defined purposes and objectives of the soil survey. They are generally designed to reflect significant differences in use and management.

Soil puddling. This condition occurs in certain soils when they are driven over while they are wet. Exertion of mechanical force destroys the soil structure by compressing and shearing and results in the rearrangement of the soil particles to a massive or nonstructural state.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Soil strength. Load-supporting capacity of a soil under specific moisture and density conditions.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Specialty crop. Crops, such as Fraser fir grown for use as Christmas trees, that require intensive management and a specific combination of soils and climate.

Spring. A small area on the landscape where water flows naturally through the soil onto the surface.

Spur ridge. A landscape position that is a sharply convex portion of a mountain side slope extending from the main ridge to some point of lower elevation.

Stand density. The degree to which an area is covered with living trees. It is usually expressed in units of basal area per acre, number of trees per acre, or the percentage of ground covered by the tree canopy as viewed from above.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, thickness of the line can be one fragment or more. It generally overlies material that weathered in place, and it is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Suitability ratings. Ratings for the degree of suitability of soils for pasture, crops, woodland, and engineering uses. The ratings and the general criteria used for their selection are as follows:

Well suited.—The intended use may be initiated and maintained by using only the standard materials and methods typically required for that use. Good results can be expected.

Moderately suited.—The limitations affecting the intended use make special planning, design, or maintenance necessary.

Poorly suited.—The intended use is difficult or costly to initiate and maintain because of certain soil properties, such as steep slopes, a high hazard of erosion, a high water table, low fertility, or a hazard of flooding. Major soil reclamation, special design, or intensive management practices are needed.

Very poorly suited, not suited, or *unsuited.*—The intended use is very difficult or costly to initiate and maintain, and thus it generally should not be undertaken.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine." The textural classes are as follows:

Sands (coarse sand, sand, fine sand, and very fine sand).—Soil material in which the content of sand is 85 percent or more and the percentage of silt plus 1.5 times the percentage of clay does not exceed 15.

Loamy sands (loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand).—Soil material in which, at the upper limit, the content of sand is 85 to 90 percent and the percentage of silt plus 1.5 times the percentage of clay is not less than 15 and, at the lower limit, the content of sand is 70 to 85 percent and the percentage of silt plus twice the percentage of clay does not exceed 30.

Sandy loams (coarse sandy loam, sandy loam, fine sandy loam, and very fine sandy loam).—Soil material in which the content of clay is 20 percent or less, the percentage of silt plus twice the percentage of clay exceeds 30, and the content of sand is 52 percent or more or soil material in which the content of clay is less than 7 percent, the content of silt is less than 50 percent, and the content of sand is 43 to 52 percent.

Loam.—Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Silt loam.—Soil material that contains 50 or more percent silt and 12 to 27 percent clay or 50 to 80 percent silt and less than 12 percent clay.

Silt.—Soil material that contains 80 or more percent silt and less than 12 percent clay.

Sandy clay loam.—Soil material that contains 20 to 35 percent clay, less than 28 percent silt, and 45 or more percent sand.

Clay loam.—Soil material that contains 27 to 40 percent clay and 20 to 45 percent sand.

Silty clay loam.—Soil material that contains 27 to 40 percent clay and less than 20 percent sand.

Sandy clay.—Soil material that contains 35 or more percent clay and 45 or more percent sand.

Silty clay.—Soil material that contains 40 or more percent clay and 40 or more percent silt.

Clay.—Soil material that contains 40 or more percent clay, less than 45 percent sand, and less than 40 percent silt.

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topography. The relative positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily high in organic matter content and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). An excessive amount of toxic substances in the soil, such as sodium or sulfur, severely hinders the establishment of vegetation or severely restricts plant growth.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Underlying material. Technically the C horizon; the part of the soil below the biologically altered A and B horizons.

Understory. The trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portions of adjacent trees and other woody growth.

Universal Soil Loss Equation. An equation used to design water-erosion control systems. The equation is A=RKLSPC wherein A is the average annual soil loss in tons per acre per year, R is the rainfall factor, K is the soil erodibility factor, L is the length of slope, S is the steepness of slope, P is the conservation practice factor, and C is the cropping and management factor.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Water table (apparent). A thick zone of free water in the soil. The apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table (seasonal high). The highest level of a saturated zone in the soil (the apparent water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wetness. A general term applied to soils that hold water at or near the surface long enough to be a common management problem.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windswept. A phase of a soil map unit where hardwood trees have been stunted, twisted, and gnarled because of exposure to high winter winds and frequent ice storms.

Windthrow. The uprooting and tipping over of trees by the wind.

Yarding paths. The paths left from cable-yarded logs as they are pulled uphill or downhill to a nearby central area.

Yield (forest land). The volume of wood fiber from harvested trees taken from a certain unit of area. Yield is usually measured in board feet or cubic feet per acre.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-81 at Cullowhee, North Carolina)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	49.5	25.3	37.4	70	-2	26	4.41	2.51	6.09	9	3.2
February----	53.0	27.0	40.0	72	2	28	4.39	2.34	6.19	8	3.3
March-------	60.8	33.3	47.1	81	11	75	5.65	3.63	7.47	10	2.6
April-------	70.7	41.1	55.9	86	22	190	3.93	2.06	5.56	7	.0
May---------	77.0	49.0	63.0	88	29	403	4.46	2.37	6.28	9	.0
June--------	82.3	56.6	69.5	92	38	585	4.23	2.54	5.74	9	.0
July--------	84.7	61.0	72.9	93	48	710	4.44	2.13	6.42	9	.0
August------	84.1	60.4	72.3	92	47	691	4.04	1.78	5.96	8	.0
September---	79.4	54.9	67.2	90	36	516	3.48	1.90	4.87	6	.0
October-----	70.8	42.0	56.4	84	20	211	3.10	1.45	4.55	6	.0
November----	60.4	32.3	46.4	77	11	39	3.37	2.13	4.48	7	.5
December----	51.7	27.1	39.4	71	4	18	4.54	2.36	6.45	8	2.0
Yearly:											
Average---	68.7	42.5	55.6	---	---	---	---	---	---	---	---
Extreme---	---	---	---	94	-4	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,492	50.04	43.83	56.04	96	11.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-81 at Cullowhee, North Carolina)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 16	May 6	May 19
2 years in 10 later than--	Apr. 10	May 1	May 14
5 years in 10 later than--	Mar. 31	Apr. 20	May 3
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 17	Oct. 6	Sept. 29
2 years in 10 earlier than--	Oct. 22	Oct. 11	Oct. 3
5 years in 10 earlier than--	Nov. 2	Oct. 20	Oct. 10

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-81 at Cullowhee, North Carolina)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	191	164	141
8 years in 10	199	170	147
5 years in 10	215	182	159
2 years in 10	230	195	171
1 year in 10	238	201	177

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BaA	Biltmore sand, 0 to 3 percent slopes, frequently flooded	347	0.1
BkB2	Braddock clay loam, 2 to 8 percent slopes, eroded	350	0.1
BkC2	Braddock clay loam, 8 to 15 percent slopes, eroded	1,004	0.3
BkD2	Braddock clay loam, 15 to 30 percent slopes, eroded	1,293	0.4
BrC	Braddock-Urban land complex, 2 to 15 percent slopes	841	0.3
BuD	Burton-Craggey-Rock outcrop complex, windswept, 8 to 30 percent slopes, stony	740	0.2
BuF	Burton-Craggey-Rock outcrop complex, windswept, 30 to 95 percent slopes, stony	768	0.2
CaC	Cashiers gravelly fine sandy loam, 8 to 15 percent slopes	360	0.1
CaD	Cashiers gravelly fine sandy loam, 15 to 30 percent slopes	709	0.2
CaE	Cashiers gravelly fine sandy loam, 30 to 50 percent slopes	4,333	1.4
CaF	Cashiers gravelly fine sandy loam, 50 to 95 percent slopes	2,863	0.9
CdC	Chandler gravelly fine sandy loam, 8 to 15 percent slopes	1,211	0.4
CdD	Chandler gravelly fine sandy loam, 15 to 30 percent slopes	4,428	1.4
CdE	Chandler gravelly fine sandy loam, 30 to 50 percent slopes	8,862	2.8
CdF	Chandler gravelly fine sandy loam, 50 to 95 percent slopes	3,502	1.1
CeC	Chandler gravelly fine sandy loam, 8 to 15 percent slopes, windswept	318	0.1
CeD	Chandler gravelly fine sandy loam, 15 to 30 percent slopes, windswept	1,266	0.4
CeE	Chandler gravelly fine sandy loam, 30 to 50 percent slopes, windswept	615	0.2
CeF	Chandler gravelly fine sandy loam, 50 to 95 percent slopes, windswept	367	0.1
ChE	Cheoah channery loam, 30 to 50 percent slopes	381	0.1
ChF	Cheoah channery loam, 50 to 95 percent slopes	2,757	0.9
CnC	Chestnut-Edneyville complex, windswept, 8 to 15 percent slopes, stony	483	0.2
CnD	Chestnut-Edneyville complex, windswept, 15 to 30 percent slopes, stony	1,308	0.4
CnE	Chestnut-Edneyville complex, windswept, 30 to 50 percent slopes, stony	856	0.3
CpD	Cleveland-Chestnut-Rock outcrop complex, windswept, 15 to 30 percent slopes	2,065	0.7
CpE	Cleveland-Chestnut-Rock outcrop complex, windswept, 30 to 50 percent slopes	3,143	1.0
CpF	Cleveland-Chestnut-Rock outcrop complex, windswept, 50 to 95 percent slopes	10,094	3.2
CrD	Cowee-Evard-Urban land complex, 15 to 30 percent slopes	838	0.3
CsD	Cullasaja very cobbly fine sandy loam, 15 to 30 percent slopes, extremely bouldery	336	0.1
CsE	Cullasaja very cobbly fine sandy loam, 30 to 50 percent slopes, extremely bouldery	879	0.3
CuC	Cullasaja-Tuckasegee complex, 8 to 15 percent slopes, stony	2,701	0.9
CuD	Cullasaja-Tuckasegee complex, 15 to 30 percent slopes, stony	19,443	6.1
CuE	Cullasaja-Tuckasegee complex, 30 to 50 percent slopes, stony	11,339	3.6
CuF	Cullasaja-Tuckasegee complex, 50 to 90 percent slopes, stony	684	0.2
CwA	Cullowhee fine sandy loam, 0 to 2 percent slopes, occasionally flooded	945	0.3
DfA	Dellwood gravelly fine sandy loam, 0 to 3 percent slopes, occasionally flooded	1,017	0.3
DrB	Dillard loam, 1 to 5 percent slopes, rarely flooded	483	0.2
DsB	Dillsboro loam, 2 to 8 percent slopes	345	0.1
DsC	Dillsboro loam, 8 to 15 percent slopes	230	0.1
EdC	Edneyville-Chestnut complex, 8 to 15 percent slopes, stony	2,270	0.7
EdD	Edneyville-Chestnut complex, 15 to 30 percent slopes, stony	12,309	3.9
EdE	Edneyville-Chestnut complex, 30 to 50 percent slopes, stony	19,205	6.1
EdF	Edneyville-Chestnut complex, 50 to 95 percent slopes, stony	15,970	5.0
EgB2	Ellijay silty clay loam, 2 to 8 percent slopes, eroded	148	*
EgC2	Ellijay silty clay loam, 8 to 15 percent slopes, eroded	192	0.1
EgD2	Ellijay silty clay loam, 15 to 30 percent slopes, eroded	279	0.1
EvC	Evard-Cowee complex, 8 to 15 percent slopes	1,226	0.4
EvD	Evard-Cowee complex, 15 to 30 percent slopes	12,079	3.8
EvE	Evard-Cowee complex, 30 to 50 percent slopes	26,513	8.4
EvF	Evard-Cowee complex, 50 to 95 percent slopes	15,007	4.7
FaC	Fannin fine sandy loam, 8 to 15 percent slopes	326	0.1
FaD	Fannin fine sandy loam, 15 to 30 percent slopes	3,297	1.0
FaE	Fannin fine sandy loam, 30 to 50 percent slopes	5,205	1.6
FaF	Fannin fine sandy loam, 50 to 95 percent slopes	1,242	0.4
HpA	Hemphill clay loam, 0 to 3 percent slopes, rarely flooded	324	0.1
JbD	Junaluska-Brasstown complex, 15 to 30 percent slopes	985	0.3
JbE	Junaluska-Brasstown complex, 30 to 50 percent slopes	1,275	0.4
JtD	Junaluska-Tsali complex, 15 to 30 percent slopes	791	0.2
JtE	Junaluska-Tsali complex, 30 to 50 percent slopes	604	0.2
JtF	Junaluska-Tsali complex, 50 to 95 percent slopes	1,909	0.6
NkA	Nikwasi fine sandy loam, 0 to 2 percent slopes, frequently flooded	1,709	0.5
OcD	Oconaluftee channery loam, 15 to 30 percent slopes	240	0.1

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
OcE	Oconaluftee channery loam, 30 to 50 percent slopes	350	0.1
OcF	Oconaluftee channery loam, 50 to 95 percent slopes	1,108	0.3
OwD	Oconaluftee channery loam, windswept, 15 to 30 percent slopes	353	0.1
OwE	Oconaluftee channery loam, windswept, 30 to 50 percent slopes	388	0.1
OwF	Oconaluftee channery loam, windswept, 50 to 95 percent slopes	783	0.2
Pt	Pits, quarries	126	*
PwD	Plott fine sandy loam, 15 to 30 percent slopes, stony	1,999	0.6
PwE	Plott fine sandy loam, 30 to 50 percent slopes, stony	8,576	2.7
PwF	Plott fine sandy loam, 50 to 95 percent slopes, stony	18,766	5.9
RdA	Reddies fine sandy loam, 0 to 2 percent slopes, occasionally flooded	318	0.1
RkF	Rock outcrop-Cleveland complex, windswept, 30 to 95 percent slopes	5,802	1.8
RoA	Rosman fine sandy loam, 0 to 2 percent slopes, occasionally flooded	370	0.1
SaB	Saunook gravelly loam, 2 to 8 percent slopes	675	0.2
SaC	Saunook gravelly loam, 8 to 15 percent slopes	3,793	1.2
SaD	Saunook gravelly loam, 15 to 30 percent slopes	2,998	1.0
SbD	Saunook gravelly loam, 15 to 30 percent slopes, stony	2,810	0.9
SoD	Soco-Stecoah complex, 15 to 30 percent slopes	1,052	0.3
SoE	Soco-Stecoah complex, 30 to 50 percent slopes	1,461	0.5
SoF	Soco-Stecoah complex, 50 to 95 percent slopes	5,542	1.8
SrD	Spivey-Santeetlah complex, 15 to 30 percent slopes, stony	1,302	0.4
SrE	Spivey-Santeetlah complex, 30 to 50 percent slopes, stony	1,248	0.4
SvB	Statler loam, 1 to 5 percent slopes, rarely flooded	443	0.1
SyA	Sylva-Whiteside complex, 0 to 2 percent slopes	772	0.2
TaC	Tanasee-Balsam complex, 8 to 15 percent slopes, stony	135	*
TaD	Tanasee-Balsam complex, 15 to 30 percent slopes, stony	627	0.2
TaE	Tanasee-Balsam complex, 30 to 50 percent slopes, stony	1,397	0.4
TrE	Trimont gravelly loam, 30 to 50 percent slopes, stony	2,832	0.9
TrF	Trimont gravelly loam, 50 to 95 percent slopes, stony	6,310	2.0
TwC	Tuckasegee-Whiteside complex, 8 to 15 percent slopes	5,515	1.7
Ud	Udorthents, loamy	2,923	0.9
UfB	Udorthents-Urban land complex, 0 to 5 percent slopes, rarely flooded	1,839	0.6
WaD	Wayah sandy loam, 15 to 30 percent slopes, stony	637	0.2
WaE	Wayah sandy loam, 30 to 50 percent slopes, stony	492	0.2
WaF	Wayah sandy loam, 50 to 95 percent slopes, stony	2,822	0.9
WeC	Wayah sandy loam, windswept, 8 to 15 percent slopes, stony	205	0.1
WeD	Wayah sandy loam, windswept, 15 to 30 percent slopes, stony	994	0.3
WeE	Wayah sandy loam, windswept, 30 to 50 percent slopes, stony	1,253	0.4
WeF	Wayah sandy loam, windswept, 50 to 95 percent slopes, stony	4,873	1.5
WtB	Whiteside-Tuckasegee complex, 2 to 8 percent slopes	2,435	0.8
	Water	2,944	0.9
	Total	316,877	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
BkB2	Braddock clay loam, 2 to 8 percent slopes, eroded
CwA	Cullowhee fine sandy loam, 0 to 2 percent slopes, occasionally flooded (where drained)
DrB	Dillard loam, 1 to 5 percent slopes, rarely flooded
DsB	Dillsboro loam, 2 to 8 percent slopes
RdA	Reddies fine sandy loam, 0 to 2 percent slopes, occasionally flooded
RoA	Rosman fine sandy loam, 0 to 2 percent slopes, occasionally flooded
SaB	Saunook gravelly loam, 2 to 8 percent slopes
SvB	Statler loam, 1 to 5 percent slopes, rarely flooded
SyA	Sylva-Whiteside complex, 0 to 2 percent slopes (where drained)
WtB	Whiteside-Tuckasegee complex, 2 to 8 percent slopes

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Tobacco	Tomatoes	Corn	Corn silage	Cabbage	Pasture
		Lbs	Tons	Bu	Tons	Crates	AUM*
BaA------------- Biltmore	IVw	2,400	26	90	17	400	5.5
BkB2------------ Braddock	IIIe	2,400	18	100	19	---	7.5
BkC2------------ Braddock	IVe	---	---	85	16	---	7.5
BkD2------------ Braddock	VIe	---	---	---	---	---	7.0
BrC**:							
Braddock--------	IVe	---	---	---	---	---	---
Urban land-----	VIIIs	---	---	---	---	---	---
BuD**:							
Burton---------	VIs	---	---	---	---	---	---
Craggey--------	VIIs	---	---	---	---	---	---
Rock outcrop---	VIIIs	---	---	---	---	---	---
BuF**:							
Burton---------	VIIs	---	---	---	---	---	---
Craggey--------	VIIs	---	---	---	---	---	---
Rock outcrop---	VIIIs	---	---	---	---	---	---
CaC------------- Cashiers	IVe	---	---	---	---	475	7.0
CaD------------- Cashiers	VIe	---	---	---	---	---	6.0
CaE------------- Cashiers	VIIe	---	---	---	---	---	5.0
CaF------------- Cashiers	VIIe	---	---	---	---	---	---
CdC------------- Chandler	IVe	---	---	---	---	---	6.5
CdD------------- Chandler	VIe	---	---	---	---	---	5.5
CdE------------- Chandler	VIIe	---	---	---	---	---	4.5
CdF------------- Chandler	VIIe	---	---	---	---	---	---
CeC------------- Chandler	IVe	---	---	---	---	---	6.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco	Tomatoes	Corn	Corn silage	Cabbage	Pasture
		Lbs	Tons	Bu	Tons	Crates	AUM*
CeD------------- Chandler	VIe	---	---	---	---	---	5.0
CeE------------- Chandler	VIIe	---	---	---	---	---	4.0
CeF------------- Chandler	VIIe	---	---	---	---	---	---
ChE------------- Cheoah	VIIe	---	---	---	---	---	6.0
ChF------------- Cheoah	VIIe	---	---	---	---	---	---
CnC:							
Chestnut-------	IVe	---	---	70	---	450	6.0
Edneyville-----	IVe	---	---	---	---	---	5.5
CnD:							
Chestnut-------	VIe	---	---	---	---	---	6.0
Edneyville-----	VIe	---	---	---	---	---	5.5
CnE:							
Chestnut-------	VIIe	---	---	---	---	---	5.5
Edneyville-----	VIIe	---	---	---	---	---	5.0
CpD**:							
Cleveland------	VIIe	---	---	---	---	---	---
Chestnut-------	VIe	---	---	---	---	---	---
Rock outcrop---	VIIIs	---	---	---	---	---	---
CpE**, CpF**:							
Cleveland------	VIIe	---	---	---	---	---	---
Chestnut-------	VIIe	---	---	---	---	---	---
Rock outcrop---	VIIIs	---	---	---	---	---	---
CrD**:							
Cowee----------	VIe	---	---	---	---	---	---
Evard----------	VIe	---	---	---	---	---	---
Urban land-----	VIIIs	---	---	---	---	---	---
CsD, CsE-------- Cullasaja	VIIs	---	---	---	---	---	---
CuC:							
Cullasaja------	VIIs	---	---	---	---	400	7.5
Tuckasegee-----	IIIe	---	---	---	---	475	8.0
CuD:							
Cullasaja------	VIIs	---	---	---	---	---	7.5

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco	Tomatoes	Corn	Corn silage	Cabbage	Pasture
		Lbs	Tons	Bu	Tons	Crates	AUM*
CuD:							
Tuckasegee-----	VIe	---	---	---	---	---	8.0
CuE:							
Cullasaja------	VIIs	---	---	---	---	---	6.0
Tuckasegee-----	VIIe	---	---	---	---	---	6.0
CuF:							
Cullasaja------	VIIs	---	---	---	---	---	---
Tuckasegee-----	VIIe	---	---	---	---	---	---
CwA------------- Cullowhee	IIIw	2,400	26	110	24	---	7.0
DfA------------- Dellwood	IIIs	2,000	22	100	19	---	7.0
DrB------------- Dillard	IIw	2,800	28	135	25	500	8.5
DsB------------- Dillsboro	IIe	2,800	26	120	22	500	8.5
DsC------------- Dillsboro	IIIe	2,600	22	110	20	450	8.0
EdC:							
Edneyville-----	IVe	---	---	---	---	450	7.0
Chestnut-------	IVe	---	---	---	---	400	6.5
EdD:							
Edneyville-----	VIe	---	---	---	---	---	6.5
Chestnut-------	VIe	---	---	---	---	---	6.0
EdE:							
Edneyville-----	VIIe	---	---	---	---	---	6.0
Chestnut-------	VIIe	---	---	---	---	---	5.5
EdF:							
Edneyville-----	VIIe	---	---	---	---	---	---
Chestnut-------	VIIe	---	---	---	---	---	---
EgB2------------ Ellijay	IIIe	---	---	---	---	---	7.5
EgC2------------ Ellijay	IVe	---	---	---	---	---	6.5
EgD2------------ Ellijay	VIe	---	---	---	---	---	5.5
EvC:							
Evard----------	IVe	2,200	---	85	16	---	6.5
Cowee----------	IVe	2,000	---	80	14	---	6.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco	Tomatoes	Corn	Corn silage	Cabbage	Pasture
		Lbs	Tons	Bu	Tons	Crates	AUM*
EvD:							
Evard----------	VIe	---	---	---	---	---	6.0
Cowee----------	VIe	---	---	---	---	---	5.5
EvE:							
Evard----------	VIIe	---	---	---	---	---	5.5
Cowee----------	VIIe	---	---	---	---	---	5.0
EvF:							
Evard----------	VIIe	---	---	---	---	---	---
Cowee----------	VIIe	---	---	---	---	---	---
FaC------------- Fannin	VIe	2,200	---	---	---	---	7.0
FaD, FaE-------- Fannin	VIIe	---	---	---	---	---	6.0
FaF------------- Fannin	VIIe	---	---	---	---	---	---
HpA***---------- Hemphill	IVw	2,200	26	120	22	---	7.0
JbD:							
Junaluska------	VIe	---	---	---	---	---	5.0
Brasstown------	VIe	---	---	---	---	---	5.5
JbE:							
Junaluska------	VIIe	---	---	---	---	---	4.5
Brasstown------	VIIe	---	---	---	---	---	5.0
JtD:							
Junaluska------	VIe	---	---	---	---	---	5.0
Tsali----------	VIe	---	---	---	---	---	2.5
JtE, JtF:							
Junaluska------	VIIe	---	---	---	---	---	---
Tsali----------	VIIe	---	---	---	---	---	---
NkA------------- Nikwasi	VIw	---	---	---	---	---	5.0
OcD------------- Oconaluftee	VIe	---	---	---	---	---	5.0
OcE------------- Oconaluftee	VIIe	---	---	---	---	---	4.0
OcF------------- Oconaluftee	VIIe	---	---	---	---	---	---
OwD------------- Oconaluftee	VIe	---	---	---	---	---	5.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco	Tomatoes	Corn	Corn silage	Cabbage	Pasture
		Lbs	Tons	Bu	Tons	Crates	AUM*
OwE------------- Oconaluftee	VIIe	---	---	---	---	---	4.0
OwF------------- Oconaluftee	VIIe	---	---	---	---	---	---
Pt**------------ Pits, quarries	VIIIs	---	---	---	---	---	---
PwD------------- Plott	VIe	---	---	---	---	---	7.0
PwE------------- Plott	VIIe	---	---	---	---	---	6.0
PwF------------- Plott	VIIe	---	---	---	---	---	---
RdA------------- Reddies	IIw	2,800	28	120	22	450	8.0
RkF:							
Rock outcrop---	VIIIs	---	---	---	---	---	---
Cleveland------	VIIe	---	---	---	---	---	---
RoA------------- Rosman	IIw	3,000	30	135	25	450	8.5
SaB------------- Saunook	IIe	3,000	30	135	25	450	8.5
SaC------------- Saunook	IVe	2,800	28	120	22	450	8.0
SaD, SbD-------- Saunook	VIe	---	---	---	---	---	8.0
SoD:							
Soco-----------	VIe	---	---	---	---	---	4.5
Stecoah--------	VIe	---	---	---	---	---	5.0
SoE:							
Soco-----------	VIIe	---	---	---	---	---	4.0
Stecoah--------	VIIe	---	---	---	---	---	4.5
SoF:							
Soco-----------	VIIe	---	---	---	---	---	---
Stecoah--------	VIIe	---	---	---	---	---	---
SrD, SrE:							
Spivey---------	VIIs	---	---	---	---	---	5.5
Santeetlah-----	VIIs	---	---	---	---	---	6.0
SvB------------- Statler	IIe	3,000	30	135	25	400	8.5

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco	Tomatoes	Corn	Corn silage	Cabbage	Pasture
		Lbs	Tons	Bu	Tons	Crates	AUM*
SyA:							
Sylva----------	IIIw	---	---	---	---	---	8.0
Whiteside------	IIw	---	---	---	---	---	8.0
TaC:							
Tanasee--------	IVe	---	---	---	---	---	---
Balsam---------	VIIs	---	---	---	---	---	---
TaD:							
Tanasee--------	VIe	---	---	---	---	---	---
Balsam---------	VIIs	---	---	---	---	---	---
TaE:							
Tanasee--------	VIIe	---	---	---	---	---	---
Balsam---------	VIIs	---	---	---	---	---	---
TrE------------- Trimont	VIIe	---	---	---	---	---	6.0
TrF------------- Trimont	VIIe	---	---	---	---	---	---
TwC:							
Tuckasegee-----	IIIe	---	---	---	---	500	8.0
Whiteside------	IVe	---	---	---	---	500	8.0
Ud-------------- Udorthents, loamy	VIIs	---	---	---	---	---	---
UfB**:							
Udorthents-----	VIIs	---	---	---	---	---	---
Urban land-----	VIIIs	---	---	---	---	---	---
WaD------------- Wayah	VIe	---	---	---	---	---	6.0
WaE------------- Wayah	VIIe	---	---	---	---	---	5.5
WaF------------- Wayah	VIIe	---	---	---	---	---	---
WeC------------- Wayah	IVe	---	---	---	---	---	6.0
WeD------------- Wayah	VIe	---	---	---	---	---	6.0
WeE------------- Wayah	VIIe	---	---	---	---	---	5.5
WeF------------- Wayah	VIIe	---	---	---	---	---	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco	Tomatoes	Corn	Corn silage	Cabbage	Pasture
		Lbs	Tons	Bu	Tons	Crates	AUM*
WtB:							
Whiteside------	IIe	---	---	---	---	500	8.0
Tuckasegee-----	IIe	---	---	---	---	500	8.0

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

*** Yields are for artificially drained areas.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
BaA------------- Biltmore	8S	Slight	Moderate	Moderate	Slight	Yellow-poplar-------	106	117	Yellow-poplar, eastern white pine, black walnut.
						Eastern white pine--	95	176	
						White oak-----------	---	---	
						American sycamore---	---	---	
						White ash-----------	---	---	
						Black cherry--------	---	---	
						Black walnut--------	---	---	
						Pitch pine----------	---	---	
						Shortleaf pine------	---	---	
						Virginia pine-------	---	---	
BkB2, BkC2------ Braddock	4C	Slight	Moderate	Moderate	Slight	Northern red oak----	80	62	Eastern white pine.
						Yellow-poplar-------	90	90	
						Eastern white pine--	95	176	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Scarlet oak---------	---	---	
						Pitch pine----------	---	---	
						Chestnut oak--------	---	---	
						Virginia pine-------	---	---	
BkD2------------ Braddock	4R	Moderate	Moderate	Moderate	Slight	Northern red oak----	70	52	Eastern white pine.
						Yellow-poplar-------	80	71	
						Eastern white pine--	85	155	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Scarlet oak---------	---	---	
						Pitch pine----------	---	---	
						Chestnut oak--------	---	---	
						Virginia pine-------	---	---	
BuD**:									
Burton---------	2R	Moderate	Moderate	Severe	Moderate	Northern red oak----	40	26	
						Red spruce----------	---	---	
						Fraser fir----------	---	---	
						Sweet birch---------	---	---	
						Yellow birch--------	---	---	
Craggey--------	2D	Moderate	Moderate	Severe	Severe	Northern red oak----	40	26	
						Red spruce----------	---	---	
						Fraser fir----------	---	---	
						Sweet birch---------	---	---	
						Yellow birch--------	---	---	
Rock outcrop.									
BuF**:									
Burton---------	2R	Severe	Severe	Severe	Moderate	Northern red oak----	40	26	
						Red spruce----------	---	---	
						Fraser fir----------	---	---	
						Sweet birch---------	---	---	
						Yellow birch--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
BuF**:									
Craggey	2R	Severe	Severe	Severe	Severe	Northern red oak	40	26	
						Red spruce	---	---	
						Fraser fir	---	---	
						Sweet birch	---	---	
						Yellow birch	---	---	
Rock outcrop.									
CaC Cashiers	7A	Slight	Slight	Slight	Slight	Yellow-poplar	93	95	Yellow-poplar, eastern white pine, Fraser fir***.
						Eastern white pine	91	168	
						Northern red oak	84	66	
						Eastern hemlock	---	---	
						Yellow buckeye	---	---	
						American beech	---	---	
						White ash	---	---	
						Red maple	---	---	
						Black cherry	---	---	
						Sweet birch	---	---	
CaD Cashiers	7R	Moderate	Moderate	Slight	Slight	Yellow-poplar	93	95	Yellow-poplar, eastern white pine, Fraser fir***.
						Eastern white pine	91	168	
						Northern red oak	84	66	
						Eastern hemlock	---	---	
						Yellow buckeye	---	---	
						American beech	---	---	
						White ash	---	---	
						Red maple	---	---	
						Black cherry	---	---	
						Sweet birch	---	---	
CaE, CaF Cashiers	7R	Severe	Severe	Slight	Slight	Yellow-poplar	93	95	Yellow-poplar, eastern white pine, Fraser fir***.
						Eastern white pine	91	168	
						Northern red oak	84	66	
						Eastern hemlock	---	---	
						Yellow buckeye	---	---	
						American beech	---	---	
						White ash	---	---	
						Red maple	---	---	
						Black cherry	---	---	
						Sweet birch	---	---	
CdC Chandler	4A	Slight	Slight	Slight	Slight	Chestnut oak	76	58	Eastern white pine.
						Eastern white pine	88	162	
						Shortleaf pine	72	114	
						Virginia pine	74	114	
						Pitch pine	---	---	
						Northern red oak	---	---	
						Scarlet oak	---	---	
						Hickory	---	---	
						Yellow-poplar	---	---	
						White oak	76	58	
						Black oak	---	---	
						Black locust	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
CdD------------- Chandler	4R	Moderate	Moderate	Slight	Slight	Chestnut oak--------	76	58	Eastern white pine.
						Eastern white pine--	88	162	
						Shortleaf pine------	72	114	
						Virginia pine-------	74	114	
						Pitch pine----------	---	---	
						Northern red oak----	---	---	
						Scarlet oak---------	---	---	
						Hickory-------------	---	---	
						Yellow-poplar-------	---	---	
						White oak-----------	76	58	
						Black oak-----------	---	---	
						Black locust--------	---	---	
CdE, CdF-------- Chandler	4R	Severe	Severe	Slight	Slight	Chestnut oak--------	76	58	Eastern white pine.
						Eastern white pine--	88	162	
						Shortleaf pine------	72	114	
						Virginia pine-------	74	114	
						Pitch pine----------	---	---	
						Northern red oak----	---	---	
						Scarlet oak---------	---	---	
						Hickory-------------	---	---	
						Yellow-poplar-------	---	---	
						White oak-----------	76	58	
						Black oak-----------	---	---	
						Black locust--------	---	---	
CeC------------- Chandler	2A	Slight	Slight	Slight	Slight	Chestnut oak--------	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Yellow-poplar-------	---	---	
						Black locust--------	---	---	
CeD------------- Chandler	2R	Moderate	Moderate	Slight	Slight	Chestnut oak--------	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Yellow-poplar-------	---	---	
						Black locust--------	---	---	
CeE, CeF-------- Chandler	2R	Severe	Severe	Slight	Slight	Chestnut oak--------	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Yellow-poplar-------	---	---	
						Black locust--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
ChE, ChF-------- Cheoah	4R	Severe	Severe	Slight	Slight	Northern red oak----	83	65	Fraser fir***, northern red oak, yellow-poplar.
						Yellow-poplar-------	103	112	
						American beech------	80	---	
						Black cherry--------	74	---	
						Eastern hemlock-----	---	---	
						Black oak-----------	---	---	
						Yellow birch--------	---	---	
						Sugar maple---------	---	---	
						Sweet birch---------	---	---	
						Scarlet oak---------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
CnC**:									
Chestnut-------	2D	Slight	Slight	Severe	Moderate	Northern red oak----	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Chestnut oak--------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Black locust--------	---	---	
Edneyville-----	2A	Slight	Slight	Severe	Slight	Northern red oak----	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Chestnut oak--------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Black locust--------	---	---	
CnD**:									
Chestnut-------	2R	Moderate	Moderate	Severe	Moderate	Northern red oak----	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Chestnut oak--------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Black locust--------	---	---	
Edneyville-----	2R	Moderate	Moderate	Severe	Slight	Northern red oak----	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Chestnut oak--------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Black locust--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
CnE**:									
Chestnut-------	2R	Severe	Severe	Severe	Moderate	Northern red oak----	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Chestnut oak--------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Black locust--------	---	---	
Edneyville-----	2R	Severe	Severe	Severe	Slight	Northern red oak----	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Chestnut oak--------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Black locust--------	---	---	
CpD**:									
Cleveland------	2D	Moderate	Moderate	Severe	Severe	Chestnut oak--------	40	26	
						Scarlet oak---------	---	---	
						Northern red oak----	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
Chestnut-------	2R	Moderate	Moderate	Severe	Moderate	Northern red oak----	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Chestnut oak--------	---	---	
Rock outcrop.									
CpE**, CpF**:									
Cleveland------	2R	Severe	Severe	Severe	Severe	Chestnut oak--------	40	26	
						Scarlet oak---------	---	---	
						Northern red oak----	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Sweet birch---------	---	---	
						Eastern hemlock-----	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol	Management concerns: Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
CpE**, CpF**:									
Chestnut-------	2R	Severe	Severe	Severe	Moderate	Northern red oak----	45	30	
						Scarlet oak---------	---	---	
						Eastern white pine--	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Sweet birch---------	---	---	
						Eastern hemlock-----	---	---	
Rock outcrop.									
CsD------------- Cullasaja	8R	Moderate	Moderate	Moderate	Slight	Yellow-poplar-------	109	122	Fraser fir***, yellow-poplar, eastern white pine, northern red oak, black cherry.
						Black cherry--------	---	---	
						Yellow birch--------	---	---	
						Northern red oak----	---	---	
						Eastern white pine--	---	---	
						Sweet birch---------	---	---	
						Sugar maple---------	---	---	
						American beech------	---	---	
						Yellow buckeye------	---	---	
						Eastern hemlock-----	---	---	
CsE------------- Cullasaja	8R	Severe	Severe	Moderate	Slight	Yellow-poplar-------	109	122	Fraser fir***, yellow-poplar, eastern white pine, northern red oak, black cherry.
						Black cherry--------	---	---	
						Yellow birch--------	---	---	
						Northern red oak----	---	---	
						Eastern white pine--	---	---	
						Sweet birch---------	---	---	
						Sugar maple---------	---	---	
						American beech------	---	---	
						Yellow buckeye------	---	---	
						Eastern hemlock-----	---	---	
CuC**:									
Cullasaja------	8X	Slight	Slight	Moderate	Slight	Yellow-poplar-------	109	122	Fraser fir***, yellow-poplar, eastern white pine, northern red oak, black cherry.
						Black cherry--------	---	---	
						Northern red oak----	---	---	
						Yellow birch--------	---	---	
						Eastern white pine--	---	---	
						Sweet birch---------	---	---	
						Sugar maple---------	---	---	
						American beech------	---	---	
						Yellow buckeye------	---	---	
						Eastern hemlock-----	---	---	
Tuckasegee-----	8A	Slight	Slight	Slight	Slight	Yellow-poplar-------	109	122	Yellow-poplar, eastern white pine, northern red oak, black cherry, Fraser fir***.
						Eastern white pine--	98	182	
						Northern red oak----	---	---	
						Black cherry--------	---	---	
						Eastern hemlock-----	---	---	
						White oak-----------	---	---	
						Yellow birch--------	---	---	
						American beech------	---	---	
						Black locust--------	---	---	
						Yellow buckeye------	---	---	
						Sugar maple---------	---	---	
						Sweet birch---------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Management concerns: Wind-throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
CuD**:									
Cullasaja	8R	Moderate	Moderate	Moderate	Slight	Yellow-poplar	109	122	Fraser fir***, yellow-poplar, eastern white pine, northern red oak, black cherry.
						Black cherry	---	---	
						Northern red oak	---	---	
						Yellow birch	---	---	
						Eastern white pine	---	---	
						American beech	---	---	
						Sugar maple	---	---	
						Eastern hemlock	---	---	
						Sweet birch	---	---	
						Yellow buckeye	---	---	
Tuckasegee	8R	Moderate	Moderate	Slight	Slight	Yellow-poplar	109	122	Yellow-poplar, eastern white pine, northern red oak, black cherry, Fraser fir***.
						Eastern white pine	98	182	
						Northern red oak	---	---	
						Black cherry	---	---	
						Eastern hemlock	---	---	
						White oak	---	---	
						Yellow birch	---	---	
						American beech	---	---	
						Black locust	---	---	
						Yellow buckeye	---	---	
						Sugar maple	---	---	
						Sweet birch	---	---	
CuE**, CuF**:									
Cullasaja	8R	Severe	Severe	Moderate	Slight	Yellow-poplar	109	122	Fraser fir***, yellow-poplar, eastern white pine, northern red oak, black cherry.
						Black cherry	---	---	
						Northern red oak	---	---	
						Yellow birch	---	---	
						Eastern white pine	---	---	
						American beech	---	---	
						Sugar maple	---	---	
						Eastern hemlock	---	---	
						Sweet birch	---	---	
						Yellow buckeye	---	---	
Tuckasegee	8R	Severe	Severe	Slight	Slight	Yellow-poplar	109	122	Yellow-poplar, eastern white pine, northern red oak, black cherry, Fraser fir***.
						Eastern white pine	98	182	
						Northern red oak	---	---	
						Black cherry	---	---	
						Eastern hemlock	---	---	
						White oak	---	---	
						Yellow birch	---	---	
						American beech	---	---	
						Black locust	---	---	
						Yellow buckeye	---	---	
						Sugar maple	---	---	
						Sweet birch	---	---	
CwA Cullowhee	8W	Slight	Moderate	Slight	Slight	Yellow-poplar	103	112	Eastern white pine.
						Shortleaf pine	82	132	
						Eastern white pine	100	139	
						American sycamore	---	---	
						Red maple	---	---	
						Yellow birch	---	---	
						Eastern hemlock	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Management concerns: Wind-throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
DfA------------- Dellwood	8F	Slight	Slight	Moderate	Slight	Yellow-poplar-------	100	107	Yellow-poplar, eastern white pine.
						Eastern white pine--	91	168	
						Red maple-----------	---	---	
						River birch---------	---	---	
						American sycamore---	---	---	
						Eastern hemlock-----	---	---	
						Sweet birch---------	---	---	
						Black cherry--------	---	---	
DrB------------- Dillard	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	98	Eastern white pine, black walnut, yellow-poplar.
						Eastern white pine--	90	166	
						Shortleaf pine------	75	120	
						Virginia pine-------	80	112	
DsB, DsC-------- Dillsboro	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	98	Yellow-poplar, eastern white pine, shortleaf pine, Fraser fir***, black walnut.
						Eastern white pine--	---	---	
						Shortleaf pine------	---	---	
						Virginia pine-------	---	---	
						White oak-----------	---	---	
						Scarlet oak---------	---	---	
						Northern red oak----	---	---	
EdC**:									
Edneyville-----	4A	Slight	Slight	Slight	Slight	Northern red oak----	80	62	Eastern white pine, yellow-poplar, shortleaf pine, Fraser fir***.
						Shortleaf pine------	64	97	
						Virginia pine-------	66	102	
						Eastern white pine--	90	166	
						Yellow-poplar-------	98	104	
						Chestnut oak--------	---	---	
						Scarlet oak---------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Pitch pine----------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
Chestnut-------	4D	Slight	Slight	Slight	Moderate	Northern red oak----	76	58	Eastern white pine, yellow-poplar, Fraser fir***, shortleaf pine.
						Eastern white pine--	78	139	
						Yellow-poplar-------	97	102	
						Scarlet oak---------	68	50	
						White oak-----------	70	52	
						Black oak-----------	71	53	
						Chestnut oak--------	69	51	
						Shortleaf pine------	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
EdD**:									
Edneyville-----	4R	Moderate	Moderate	Slight	Slight	Northern red oak----	80	62	Eastern white pine, yellow-poplar, shortleaf pine, Fraser fir***.
						Shortleaf pine------	64	97	
						Virginia pine-------	66	102	
						Eastern white pine--	90	166	
						Yellow-poplar-------	98	104	
						Chestnut oak--------	---	---	
						Scarlet oak---------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Pitch pine----------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
Chestnut-------	4R	Moderate	Moderate	Slight	Moderate	Northern red oak----	76	58	Eastern white pine, yellow-poplar, Fraser fir***.
						Eastern white pine--	78	139	
						Yellow-poplar-------	97	102	
						Scarlet oak---------	68	50	
						White oak-----------	70	52	
						Black oak-----------	71	53	
						Chestnut oak--------	69	51	
						Shortleaf pine------	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
EdE**, EdF**:									
Edneyville-----	4R	Severe	Severe	Slight	Slight	Northern red oak----	80	62	Eastern white pine, yellow-poplar, shortleaf pine, Fraser fir***.
						Shortleaf pine------	64	97	
						Virginia pine-------	66	102	
						Eastern white pine--	90	166	
						Yellow-poplar-------	98	104	
						Chestnut oak--------	---	---	
						Scarlet oak---------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Pitch pine----------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
Chestnut-------	4R	Severe	Severe	Slight	Moderate	Northern red oak----	76	58	Eastern white pine, yellow-poplar, Fraser fir***.
						Eastern white pine--	78	139	
						Yellow-poplar-------	97	102	
						Scarlet oak---------	68	50	
						White oak-----------	70	52	
						Black oak-----------	71	53	
						Chestnut oak--------	69	51	
						Shortleaf pine------	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Management concerns: Wind-throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
EgB2, EgC2: Ellijay	6T	Slight	Slight	Moderate	Slight	Virginia pine	58	86	Eastern white pine.
						Pitch pine	---	---	
						White oak	---	---	
						Post oak	---	---	
						Black oak	---	---	
						Scarlet oak	---	---	
						Chestnut oak	---	---	
						Hickory	---	---	
EgD2: Ellijay	6R	Moderate	Moderate	Moderate	Slight	Virginia pine	58	86	Eastern white pine.
						Pitch pine	---	---	
						White oak	---	---	
						Post oak	---	---	
						Black oak	---	---	
						Scarlet oak	---	---	
						Chestnut oak	---	---	
						Hickory	---	---	
EvC**: Evard	4A	Slight	Slight	Slight	Slight	Chestnut oak	77	59	Eastern white pine, yellow-poplar.
						Shortleaf pine	73	116	
						Pitch pine	---	---	
						Virginia pine	69	107	
						Eastern white pine	93	172	
						Yellow-poplar	95	98	
						White oak	---	---	
						Northern red oak	---	---	
						Hickory	---	---	
						Scarlet oak	---	---	
						Black oak	---	---	
						Black locust	---	---	
Cowee	3D	Slight	Slight	Slight	Moderate	Chestnut oak	55	38	Eastern white pine.
						Virginia pine	63	96	
						Scarlet oak	54	38	
						Shortleaf pine	78	126	
						Eastern white pine	78	139	
						Yellow-poplar	80	71	
						Pitch pine	---	---	
						Northern red oak	---	---	
						Black oak	---	---	
						White oak	---	---	
						Hickory	---	---	
						Black locust	---	---	
EvD**: Evard	4R	Moderate	Moderate	Slight	Slight	Chestnut oak	77	59	Eastern white pine, yellow-poplar.
						Shortleaf pine	73	116	
						Pitch pine	---	---	
						Virginia pine	69	107	
						Eastern white pine	93	172	
						Yellow-poplar	95	98	
						White oak	---	---	
						Northern red oak	---	---	
						Hickory	---	---	
						Scarlet oak	---	---	
						Black oak	---	---	
						Black locust	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
EvD**:									
Cowee----------	3R	Moderate	Moderate	Slight	Moderate	Chestnut oak--------	55	38	Eastern white pine.
						Virginia pine-------	63	96	
						Scarlet oak---------	54	38	
						Shortleaf pine------	78	126	
						Eastern white pine--	78	139	
						Yellow-poplar-------	80	71	
						Pitch pine----------	---	---	
						Northern red oak----	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
EvE**, EvF**:									
Evard----------	4R	Severe	Severe	Slight	Slight	Chestnut oak--------	77	59	Eastern white pine, yellow-poplar.
						Shortleaf pine------	73	116	
						Pitch pine----------	---	---	
						Virginia pine-------	69	107	
						Eastern white pine--	93	172	
						Yellow-poplar-------	95	98	
						White oak-----------	---	---	
						Northern red oak----	---	---	
						Hickory-------------	---	---	
						Scarlet oak---------	---	---	
						Black oak-----------	---	---	
						Black locust--------	---	---	
Cowee----------	3R	Severe	Severe	Slight	Moderate	Chestnut oak--------	55	38	Eastern white pine.
						Virginia pine-------	63	96	
						Scarlet oak---------	54	38	
						Shortleaf pine------	78	126	
						Eastern white pine--	78	139	
						Yellow-poplar-------	80	71	
						Pitch pine----------	---	---	
						Northern red oak----	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
FaC------------- Fannin	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	96	100	Eastern white pine, yellow-poplar, Fraser fir***.
						Northern red oak----	---	---	
						Eastern white pine--	94	174	
						Pitch pine----------	---	---	
						Shortleaf pine------	---	---	
						Virginia pine-------	---	---	
						Scarlet oak---------	---	---	
						Chestnut oak--------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
FaD------------- Fannin	7R	Moderate	Moderate	Slight	Slight	Yellow-poplar-------	96	100	Eastern white pine, yellow-poplar, Fraser fir***.
						Northern red oak----	---	---	
						Eastern white pine--	94	174	
						Pitch pine----------	---	---	
						Shortleaf pine------	---	---	
						Virginia pine-------	---	---	
						Scarlet oak---------	---	---	
						Chestnut oak--------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
FaE, FaF-------- Fannin	7R	Severe	Severe	Slight	Slight	Yellow-poplar-------	96	100	Eastern white pine, yellow-poplar, Fraser fir***.
						Northern red oak----	---	---	
						Eastern white pine--	94	174	
						Pitch pine----------	---	---	
						Shortleaf pine------	---	---	
						Virginia pine-------	---	---	
						Scarlet oak---------	---	---	
						Chestnut oak--------	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
HpA------------- Hemphill	6W	Slight	Severe	Severe	Slight	Yellow-poplar-------	88	86	Eastern white pine.
						Red maple-----------	---	---	
						Yellow birch--------	---	---	
						Eastern hemlock-----	---	---	
						Eastern white pine--	84	153	
						Alder---------------	---	---	
JbD**:									
Junaluska------	3R	Moderate	Moderate	Moderate	Moderate	Scarlet oak---------	65	48	Eastern white pine.
						Chestnut oak--------	65	48	
						White oak-----------	61	44	
						Shortleaf pine------	68	106	
						Virginia pine-------	74	114	
						Eastern white pine--	86	157	
						Pitch pine----------	---	---	
						Northern red oak----	---	---	
						Black oak-----------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
Brasstown------	4R	Moderate	Moderate	Slight	Slight	Scarlet oak---------	80	62	Eastern white pine.
						White oak-----------	80	62	
						Eastern white pine--	91	168	
						Shortleaf pine------	71	112	
						Virginia pine-------	74	114	
						Pitch pine----------	---	---	
						Northern red oak----	---	---	
						Black oak-----------	---	---	
						Chestnut oak--------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
JbE**:									
Junaluska	3R	Severe	Severe	Moderate	Moderate	Scarlet oak	65	48	Eastern white pine.
						Chestnut oak	65	48	
						White oak	61	44	
						Shortleaf pine	68	106	
						Virginia pine	74	114	
						Eastern white pine	86	157	
						Pitch pine	---	---	
						Northern red oak	---	---	
						Black oak	---	---	
						Hickory	---	---	
						Black locust	---	---	
Brasstown	4R	Severe	Severe	Slight	Slight	Scarlet oak	80	62	Eastern white pine.
						White oak	80	62	
						Eastern white pine	91	168	
						Shortleaf pine	71	112	
						Virginia pine	74	114	
						Pitch pine	---	---	
						Northern red oak	---	---	
						Black oak	---	---	
						Chestnut oak	---	---	
						Hickory	---	---	
						Black locust	---	---	
JtD**:									
Junaluska	3R	Moderate	Moderate	Moderate	Moderate	Scarlet oak	65	48	Eastern white pine.
						Chestnut oak	65	48	
						White oak	61	44	
						Shortleaf pine	68	106	
						Virginia pine	74	114	
						Eastern white pine	86	157	
						Pitch pine	---	---	
						Northern red oak	---	---	
						Black oak	---	---	
						Hickory	---	---	
Tsali	2D	Moderate	Severe	Moderate	Severe	Scarlet oak	52	36	Virginia pine.
						Shortleaf pine	60	88	
						Virginia pine	66	100	
						White oak	48	32	
						Chestnut oak	---	---	
						Black oak	---	---	
						Hickory	---	---	
						Pitch pine	---	---	
JtE**, JtF**:									
Junaluska	3R	Severe	Severe	Moderate	Moderate	Scarlet oak	65	48	Eastern white pine.
						Chestnut oak	65	48	
						White oak	61	44	
						Shortleaf pine	68	106	
						Virginia pine	74	114	
						Eastern white pine	86	157	
						Pitch pine	---	---	
						Northern red oak	---	---	
						Black oak	---	---	
						Hickory	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
JtE**, JtF**:									
Tsali----------	2R	Severe	Severe	Moderate	Severe	Scarlet oak---------	52	36	Virginia pine.
						Shortleaf pine------	60	88	
						Virginia pine-------	66	100	
						White oak-----------	48	32	
						Chestnut oak--------	---	---	
						Black oak-----------	---	---	
						Hickory-------------	---	---	
						Pitch pine----------	---	---	
NkA-------------Nikwasi	6W	Slight	Severe	Severe	Slight	Yellow-poplar-------	88	86	Eastern white pine.
						Eastern white pine--	86	157	
						American sycamore---	---	---	
						Red maple-----------	---	---	
						Yellow birch--------	---	---	
						Eastern hemlock-----	---	---	
						Sweet birch---------	---	---	
						Alder---------------	---	---	
OcD-------------Oconaluftee	10R	Moderate	Moderate	Slight	Slight	Red spruce----------	64	150	Red spruce, Fraser fir***, northern red oak.
						Fraser fir----------	---	---	
						Northern red oak----	---	---	
						Black oak-----------	---	---	
						American beech------	---	---	
						Yellow birch--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						Eastern hemlock-----	---	---	
						Yellow buckeye------	---	---	
						Sweet birch---------	---	---	
OcE, OcF--------Oconaluftee	10R	Severe	Severe	Slight	Slight	Red spruce----------	64	150	Red spruce, Fraser fir***, northern red oak.
						Fraser fir----------	---	---	
						Northern red oak----	---	---	
						Black oak-----------	---	---	
						American beech------	---	---	
						Yellow birch--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						Eastern hemlock-----	---	---	
						Yellow buckeye------	---	---	
						Sweet birch---------	---	---	
OwD-------------Oconaluftee	2R	Moderate	Moderate	Severe	Slight	Northern red oak----	40	26	
						Red spruce----------	---	---	
						Fraser fir----------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						Yellow birch--------	---	---	
						Sweet birch---------	---	---	
OwE, OwF--------Oconaluftee	2R	Severe	Severe	Severe	Slight	Northern red oak----	40	26	
						Red spruce----------	---	---	
						Fraser fir----------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						Yellow birch--------	---	---	
						Sweet birch---------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
PwD------------- Plott	5R	Moderate	Moderate	Slight	Slight	Northern red oak----	85	67	Fraser fir***, northern red oak, yellow-poplar, black cherry.
						Yellow-poplar-------	113	128	
						Black cherry--------	87	---	
						American beech------	---	---	
						Sugar maple---------	---	---	
						Eastern hemlock-----	---	---	
						Black oak-----------	---	---	
						Yellow birch--------	---	---	
						Sweet birch---------	---	---	
						Scarlet oak---------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
PwE, PwF-------- Plott	5R	Severe	Severe	Slight	Slight	Northern red oak----	85	67	Fraser fir***, northern red oak, yellow-poplar, black cherry.
						Yellow-poplar-------	113	128	
						Black cherry--------	87	---	
						American beech------	---	---	
						Sugar maple---------	---	---	
						Eastern hemlock-----	---	---	
						Black oak-----------	---	---	
						Yellow birch--------	---	---	
						Sweet birch---------	---	---	
						Scarlet oak---------	---	---	
						White oak-----------	---	---	
						Hickory-------------	---	---	
RdA------------- Reddies	8A	Slight	Slight	Slight	Moderate	Yellow-poplar-------	105	115	Yellow-poplar, eastern white pine.
						American sycamore---	---	---	
						Red maple-----------	---	---	
						Eastern white pine--	---	---	
						River birch---------	---	---	
RkF**:									
Rock outcrop.									
Cleveland------	2R	Severe	Severe	Severe	Severe	Chestnut oak--------	40	26	
						Scarlet oak---------	---	---	
						Northern red oak----	---	---	
						Eastern white pine--	---	---	
						Sweet birch---------	---	---	
						Eastern hemlock-----	---	---	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
RoA------------- Rosman	8A	Slight	Slight	Slight	Slight	Yellow-poplar-------	105	115	Yellow-poplar, eastern white pine, black walnut.
						Eastern white pine--	100	186	
						Northern red oak----	---	---	
						American sycamore---	---	---	
						Black walnut--------	---	---	
						Red maple-----------	---	---	
						River birch---------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Common trees	Site index	Volume*	
SaB, SaC-------- Saunook	8A	Slight	Slight	Slight	Slight	Yellow-poplar-------	107	119	Yellow-poplar,
						Eastern white pine--	104	194	eastern white
						Northern red oak----	---	---	pine, northern
						White oak-----------	---	---	red oak,
						Scarlet oak---------	---	---	Fraser fir***,
						Eastern hemlock-----	---	---	black walnut.
						Red maple-----------	---	---	
						Black cherry--------	---	---	
						American beech------	---	---	
						Sweet birch---------	---	---	
						Yellow buckeye------	---	---	
SaD, SbD-------- Saunook	8R	Moderate	Moderate	Slight	Slight	Yellow-poplar-------	107	119	Yellow-poplar,
						Eastern white pine--	104	194	eastern white
						Northern red oak----	---	---	pine, northern
						White oak-----------	---	---	red oak,
						Scarlet oak---------	---	---	Fraser fir***,
						Eastern hemlock-----	---	---	black walnut.
						Red maple-----------	---	---	
						Black cherry--------	---	---	
						American beech------	---	---	
						Sweet birch---------	---	---	
						Yellow buckeye------	---	---	
SoD**:									
Soco-----------	11R	Moderate	Moderate	Slight	Moderate	Eastern white pine--	85	155	Eastern white
						Shortleaf pine------	61	90	pine, Norway
						Pitch pine----------	---	---	spruce, Fraser
						Virginia pine-------	---	---	fir***.
						Chestnut oak--------	68	50	
						Scarlet oak---------	76	58	
						Northern red oak----	---	---	
						White oak-----------	---	---	
						Black oak-----------	---	---	
						Yellow-poplar-------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
Stecoah--------	12R	Moderate	Moderate	Slight	Slight	Eastern white pine--	91	168	Eastern white
						Shortleaf pine------	69	108	pine, Fraser
						Scarlet oak---------	---	---	fir***.
						White oak-----------	82	64	
						Yellow-poplar-------	---	---	
						Chestnut oak--------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Black oak-----------	---	---	
						Northern red oak----	---	---	
						Pitch pine----------	---	---	
						Black locust--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol	Management concerns: Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
SoE**, SoF**:									
Soco-----------	11R	Severe	Severe	Slight	Moderate	Eastern white pine--	85	155	Eastern white pine, Norway spruce, Fraser fir***.
						Shortleaf pine------	61	90	
						Pitch pine----------	---	---	
						Virginia pine-------	---	---	
						Chestnut oak--------	68	50	
						Scarlet oak---------	76	58	
						Northern red oak----	---	---	
						White oak-----------	---	---	
						Black oak-----------	---	---	
						Yellow-poplar-------	---	---	
						Hickory-------------	---	---	
						Black locust--------	---	---	
Stecoah--------	12R	Severe	Severe	Slight	Slight	Eastern white pine--	91	168	Eastern white pine, Fraser fir***.
						Shortleaf pine------	69	108	
						Scarlet oak---------	---	---	
						White oak-----------	82	64	
						Yellow-poplar-------	---	---	
						Chestnut oak--------	---	---	
						Virginia pine-------	---	---	
						Hickory-------------	---	---	
						Black oak-----------	---	---	
						Northern red oak----	---	---	
						Pitch pine----------	---	---	
						Black locust--------	---	---	
SrD**:									
Spivey---------	8R	Moderate	Moderate	Moderate	Slight	Yellow-poplar-------	100	107	Yellow-poplar, eastern white pine, Fraser fir***.
						Northern red oak----	80	62	
						Eastern white pine--	90	166	
						Eastern hemlock-----	---	---	
						Sugar maple---------	---	---	
						White oak-----------	---	---	
						Yellow birch--------	---	---	
						Black cherry--------	---	---	
						American beech------	---	---	
						Sweet birch---------	---	---	
						Yellow buckeye------	---	---	
						Black oak-----------	---	---	
Santeetlah-----	8R	Moderate	Moderate	Slight	Slight	Yellow-poplar-------	108	121	Northern red oak, black cherry, sugar maple, Fraser fir***.
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						Eastern hemlock-----	---	---	
						Yellow buckeye------	---	---	
						Yellow birch--------	---	---	
						Northern red oak----	---	---	
						Black oak-----------	---	---	
						White oak-----------	---	---	
						American beech------	---	---	
						Sweet birch---------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
SrE**:									
Spivey	8R	Severe	Severe	Moderate	Slight	Yellow-poplar	100	107	Yellow-poplar, eastern white pine, Fraser fir***.
						Northern red oak	80	62	
						Eastern white pine	90	166	
						Eastern hemlock	---	---	
						Sugar maple	---	---	
						White oak	---	---	
						Yellow birch	---	---	
						Black cherry	---	---	
						American beech	---	---	
						Sweet birch	---	---	
						Yellow buckeye	---	---	
						Black oak	---	---	
Santeetlah	8R	Severe	Severe	Slight	Slight	Yellow-poplar	108	121	Northern red oak, black cherry, sugar maple, Fraser fir***.
						Black cherry	---	---	
						Sugar maple	---	---	
						Eastern hemlock	---	---	
						Yellow buckeye	---	---	
						Yellow birch	---	---	
						Northern red oak	---	---	
						Black oak	---	---	
						White oak	---	---	
						American beech	---	---	
						Sweet birch	---	---	
SvB Statler	8A	Slight	Slight	Slight	Slight	Yellow-poplar	100	107	Yellow-poplar, black walnut, eastern white pine.
						White oak	80	62	
						Eastern white pine	90	166	
						Red maple	---	---	
						Northern red oak	---	---	
						Hickory	---	---	
SyA**:									
Sylva	8W	Slight	Severe	Severe	Slight	Yellow-poplar	100	107	Yellow-poplar, eastern white pine.
						Eastern white pine	---	---	
						White oak	---	---	
						Red maple	---	---	
						Eastern hemlock	---	---	
						Basswood	---	---	
						Alder	---	---	
Whiteside	7A	Slight	Slight	Slight	Slight	Yellow-poplar	95	98	Eastern white pine, yellow-poplar, black cherry.
						Eastern white pine	90	166	
						Black cherry	90	---	
						Eastern hemlock	---	---	
						Sugar maple	---	---	
						Red maple	---	---	
						White oak	---	---	
						Yellow birch	---	---	
						Sweet birch	---	---	
						Black locust	---	---	
						Alder	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
TaC**:									
Tanasee	10A	Slight	Slight	Slight	Slight	Red spruce	64	150	Red spruce, Fraser fir***.
						Fraser fir	---	---	
						Northern red oak	---	---	
						Black cherry	---	---	
						Black oak	---	---	
						American beech	---	---	
						Yellow birch	---	---	
						Sugar maple	---	---	
						Eastern hemlock	---	---	
						Yellow buckeye	---	---	
						Sweet birch	---	---	
Balsam	10A	Slight	Slight	Slight	Slight	Red spruce	64	150	Red spruce, Fraser fir***.
						Fraser fir	---	---	
						Northern red oak	---	---	
						Yellow birch	---	---	
						Sugar maple	---	---	
						Sweet birch	---	---	
						Eastern hemlock	---	---	
TaD**:									
Tanasee	10R	Moderate	Moderate	Slight	Slight	Red spruce	64	150	Red spruce, Fraser fir***.
						Fraser fir	---	---	
						Northern red oak	---	---	
						Black cherry	---	---	
						Black oak	---	---	
						American beech	---	---	
						Yellow birch	---	---	
						Sugar maple	---	---	
						Eastern hemlock	---	---	
						Yellow buckeye	---	---	
						Sweet birch	---	---	
Balsam	10R	Moderate	Moderate	Slight	Slight	Red spruce	64	150	Red spruce, Fraser fir***.
						Fraser fir	---	---	
						Northern red oak	---	---	
						Yellow birch	---	---	
						Sugar maple	---	---	
						Sweet birch	---	---	
						Eastern hemlock	---	---	
TaE**:									
Tanasee	10R	Severe	Severe	Slight	Slight	Red spruce	64	150	Red spruce, Fraser fir***.
						Fraser fir	---	---	
						Northern red oak	---	---	
						Black cherry	---	---	
						Black oak	---	---	
						American beech	---	---	
						Yellow birch	---	---	
						Sugar maple	---	---	
						Eastern hemlock	---	---	
						Yellow buckeye	---	---	
						Sweet birch	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
TaE**:									
Balsam	10R	Moderate	Moderate	Slight	Slight	Red spruce	64	150	Red spruce, Fraser fir***.
						Fraser fir	---	---	
						Northern red oak	---	---	
						Yellow birch	---	---	
						Sugar maple	---	---	
						Sweet birch	---	---	
						Eastern hemlock	---	---	
TrE, TrF: Trimont	8R	Severe	Severe	Slight	Slight	Yellow-poplar	102	110	Yellow-poplar, northern red oak, black oak, white oak.
						Northern red oak	94	76	
						Black oak	---	---	
						White oak	---	---	
						American beech	---	---	
						Black cherry	---	---	
						Sweet birch	---	---	
TwC**:									
Tuckasegee	8A	Slight	Slight	Slight	Slight	Yellow-poplar	109	122	Yellow-poplar, eastern white pine, northern red oak, black cherry, Fraser fir***.
						Eastern white pine	98	182	
						Northern red oak	---	---	
						Black cherry	---	---	
						Eastern hemlock	---	---	
						White oak	---	---	
						Yellow birch	---	---	
						American beech	---	---	
						Black locust	---	---	
						Yellow buckeye	---	---	
						Sugar maple	---	---	
						Sweet birch	---	---	
Whiteside	7A	Slight	Slight	Slight	Slight	Yellow-poplar	95	98	Eastern white pine, yellow-poplar, black cherry.
						Eastern white pine	90	166	
						Black cherry	90	---	
						Eastern hemlock	---	---	
						Sugar maple	---	---	
						Red maple	---	---	
						White oak	---	---	
						Yellow birch	---	---	
						Sweet birch	---	---	
						Black locust	---	---	
WaD: Wayah	4R	Moderate	Moderate	Slight	Slight	Northern red oak	72	54	Northern red oak, red spruce, Fraser fir***.
						Black cherry	72	---	
						Red spruce	57	129	
						Fraser fir	60	---	
						American beech	---	---	
						Yellow birch	---	---	
						Sugar maple	---	---	
						Black oak	---	---	
						Yellow buckeye	---	---	
						Eastern hemlock	---	---	
						Sweet birch	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
WaE, WaF-------- Wayah	4R	Severe	Severe	Slight	Slight	Northern red oak----	72	54	Northern red oak, red spruce, Fraser fir***.
						Black cherry--------	72	---	
						Red spruce----------	57	129	
						Fraser fir----------	60	---	
						American beech------	---	---	
						Yellow birch--------	---	---	
						Sugar maple---------	---	---	
						Black oak-----------	---	---	
						Yellow buckeye------	---	---	
						Eastern hemlock-----	---	---	
						Sweet birch---------	---	---	
WeC------------- Wayah	2A	Slight	Slight	Severe	Slight	Northern red oak----	43	28	
						Red spruce----------	---	---	
						Fraser fir----------	---	---	
						Yellow birch--------	---	---	
						Sugar maple---------	---	---	
						Black cherry--------	---	---	
						Sweet birch---------	---	---	
WeD------------- Wayah	2R	Moderate	Moderate	Severe	Slight	Northern red oak----	43	28	
						Red spruce----------	---	---	
						Fraser fir----------	---	---	
						Yellow birch--------	---	---	
						Sugar maple---------	---	---	
						Black cherry--------	---	---	
						Sweet birch---------	---	---	
WeE, WeF-------- Wayah	2R	Severe	Severe	Severe	Slight	Northern red oak----	43	28	
						Red spruce----------	---	---	
						Fraser fir----------	---	---	
						Yellow birch--------	---	---	
						Sugar maple---------	---	---	
						Black cherry--------	---	---	
						Sweet birch---------	---	---	
WtB**: Whiteside------	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	98	Eastern white pine, yellow-poplar, black cherry.
						Eastern white pine--	90	166	
						Black cherry--------	90	---	
						Eastern hemlock-----	---	---	
						Sugar maple---------	---	---	
						Red maple-----------	---	---	
						White oak-----------	---	---	
						Yellow birch--------	---	---	
						Sweet birch---------	---	---	
						Black locust--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
WtB**:									
Tuckasegee-----	8A	Slight	Slight	Slight	Slight	Yellow-poplar-------	109	122	Yellow-poplar, eastern white pine, northern red oak, black cherry, Fraser fir***.
						Eastern white pine--	98	182	
						Northern red oak----	---	---	
						Black cherry--------	---	---	
						Eastern hemlock-----	---	---	
						White oak-----------	---	---	
						Yellow birch--------	---	---	
						American beech------	---	---	
						Black locust--------	---	---	
						Yellow buckeye------	---	---	
						Sugar maple---------	---	---	
						Red maple-----------	---	---	
						Sweet birch---------	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

*** Species is used for Christmas trees.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BaA: Biltmore	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy, flooding.	Severe: too sandy.	Severe: flooding.
BkB2: Braddock	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
BkC2: Braddock	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
BkD2: Braddock	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
BrC*:					
Braddock	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Urban land.					
BuD*:					
Burton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: large stones, slope.	Severe: large stones, slope.
Craggey	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, depth to rock, slope.	Severe: fragile.	Severe: slope, depth to rock.
Rock outcrop.					
BuF*:					
Burton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Craggey	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, depth to rock, slope.	Severe: slope, fragile.	Severe: slope, depth to rock.
Rock outcrop.					
CaC: Cashiers	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
CaD: Cashiers	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
CaE, CaF: Cashiers	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CdC------------------ Chandler	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
CdD------------------ Chandler	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
CdE, CdF------------- Chandler	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CeC------------------ Chandler	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
CeD------------------ Chandler	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
CeE, CeF------------- Chandler	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
ChE, ChF------------- Cheoah	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CnC*:					
Chestnut-------------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, droughty, slope.
Edneyville-----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, droughty, slope.
CnD*:					
Chestnut-------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Edneyville-----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
CnE*:					
Chestnut-------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Edneyville-----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CpD*:					
Cleveland------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CpD*:					
Chestnut	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Rock outcrop.					
CpE*, CpF*:					
Cleveland	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Chestnut	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Rock outcrop.					
CrD*:					
Cowee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Evard	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Urban land.					
CsD: Cullasaja	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones, slope.
CsE: Cullasaja	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones, slope.	Severe: large stones, slope.
CuC*:					
Cullasaja	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones.
Tuckasegee	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, large stones, slope.
CuD*:					
Cullasaja	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones, slope.
Tuckasegee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CuE*, CuF*:					
Cullasaja	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones, slope.	Severe: large stones, slope.
Tuckasegee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CwA Cullowhee	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
DfA Dellwood	Severe: flooding.	Moderate: wetness.	Severe: small stones.	Slight	Severe: droughty.
DrB Dillard	Severe: flooding.	Slight	Moderate: slope, wetness, percs slowly.	Slight	Slight.
DsB Dillsboro	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: large stones.
DsC Dillsboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
EdC*:					
Edneyville	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty, slope.
Chestnut	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty, slope.
EdD*:					
Edneyville	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Chestnut	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
EdE*, EdF*:					
Edneyville	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Chestnut	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
EgB2: Ellijay	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
EgC2: Ellijay	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
EgD2: Ellijay	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
EvC*:					
Evard	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, large stones.
Cowee	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope, depth to rock.
EvD*:					
Evard	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Cowee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
EvE*, EvF*:					
Evard	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Cowee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
FaC: Fannin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: small stones, slope.
FaD: Fannin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
FaE, FaF: Fannin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HpA: Hemphill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
JbD*:					
Junaluska	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Brasstown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
JbE*:					
Junaluska	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Brasstown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
JtD*:					
Junaluska	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Tsali	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.
JtE*, JtF*:					
Junaluska	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Tsali	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
NkA Nikwasi	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
OcD Oconaluftee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
OcE, OcF Oconaluftee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
OwD Oconaluftee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
OwE, OwF Oconaluftee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Pt*. Pits, quarries					
PwD Plott	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
PwE, PwF Plott	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RdA Reddies	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness.	Slight	Moderate: droughty, flooding.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
RkF*: Rock outcrop.					
Cleveland	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
RoA: Rosman	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
SaB: Saunook	Slight	Slight	Severe: small stones.	Slight	Moderate: small stones.
SaC: Saunook	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
SaD, SbD: Saunook	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
SoD*: Soco	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Stecoah	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
SoE*, SoF*: Soco	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Stecoah	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
SrD*: Spivey	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones.	Severe: slope.
Santeetlah	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
SrE*: Spivey	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Santeetlah	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SvB------------------- Statler	Severe: flooding.	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
SyA*:					
Sylva----------------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Whiteside------------	Moderate: wetness.	Moderate: wetness.	Moderate: small stones, wetness.	Moderate: wetness.	Moderate: wetness.
TaC*:					
Tanasee--------------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
Balsam---------------	Moderate: slope.	Moderate: slope.	Severe: slope, small stones, large stones.	Moderate: large stones.	Severe: large stones.
TaD*:					
Tanasee--------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Balsam---------------	Severe: slope.	Severe: slope.	Severe: slope, small stones, large stones.	Moderate: large stones, slope.	Severe: large stones, slope.
TaE*:					
Tanasee--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Balsam---------------	Severe: slope.	Severe: slope.	Severe: slope, small stones, large stones.	Moderate: large stones, slope.	Severe: large stones, slope.
TrE, TrF-------------- Trimont	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
TwC*:					
Tuckasegee-----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, large stones, slope.
Whiteside------------	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: wetness.
Ud. Udorthents, loamy					
UfB*:					
Udorthents.					
Urban land.					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WaD-------------------- Wayah	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
WaE, WaF-------------- Wayah	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WeC-------------------- Wayah	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
WeD-------------------- Wayah	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
WeE, WeF-------------- Wayah	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WtB*:					
Whiteside------------	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
Tuckasegee-----------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
BaA-----Biltmore	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BkB2-----Braddock	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BkC2-----Braddock	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BkD2-----Braddock	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BrC*:										
Braddock-----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
BuD*:										
Burton-----	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Craggey-----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop.										
BuF*:										
Burton-----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Craggey-----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop.										
CaC-----Cashiers	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CaD-----Cashiers	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CaE, CaF-----Cashiers	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CdC-----Chandler	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CdD-----Chandler	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CdE, CdF-----Chandler	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
CeC, CeD, CeE, CeF-Chandler	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
ChE, ChF------------ Cheoah	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CnC*:										
Chestnut-----------	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Edneyville---------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CnD*:										
Chestnut-----------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Edneyville---------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CnE*:										
Chestnut-----------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Edneyville---------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CpD*:										
Cleveland----------	Very poor.	Very poor.	Poor	Fair	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Chestnut-----------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Rock outcrop.										
CpE*, CpF*:										
Cleveland----------	Very poor.	Very poor.	Poor	Fair	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Chestnut-----------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop.										
CrD*:										
Cowee--------------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Evard--------------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Urban land.										
CsD, CsE------------ Cullasaja	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CuC*:										
Cullasaja----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Tuckasegee---------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
CuD*:										
Cullasaja	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Tuckasegee	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CuE*, CuF*:										
Cullasaja	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Tuckasegee	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CwA Cullowhee	Fair	Good	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair.
DfA Dellwood	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
DrB Dillard	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DsB Dillsboro	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DsC Dillsboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EdC*:										
Edneyville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Chestnut	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
EdD*:										
Edneyville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Chestnut	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
EdE*, EdF*:										
Edneyville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Chestnut	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
EgB2 Ellijay	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EgC2 Ellijay	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EgD2 Ellijay	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
EvC*:										
Evard	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Cowee	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
EvD*:										
Evard	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Cowee	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
EvE*, EvF*:										
Evard	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Cowee	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
FaC Fannin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FaD Fannin	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FaE, FaF Fannin	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
HpA Hemphill	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
JbD*:										
Junaluska	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Brasstown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
JbE*:										
Junaluska	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Brasstown	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
JtD*:										
Junaluska	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Tsali	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
JtE*, JtF*:										
Junaluska	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Tsali	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
NkA----------------- Nikwasi	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
OcD----------------- Oconaluftee	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
OcE, OcF----------- Oconaluftee	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
OwD----------------- Oconaluftee	Poor	Fair	Good	Very poor.	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
OwE, OwF----------- Oconaluftee	Very poor.	Poor	Good	Very poor.	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Pt*. Pits, quarries										
PwD----------------- Plott	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
PwE, PwF----------- Plott	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
RdA----------------- Reddies	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
RkF*: Rock outcrop.										
Cleveland---------	Very poor.	Very poor.	Poor	Fair	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.
RoA----------------- Rosman	Good	Good	Good	Good	Good	Fair	Very poor.	Good	Good	Very poor.
SaB----------------- Saunook	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SaC----------------- Saunook	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SaD, SbD----------- Saunook	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
SoD*:										
Soco---------------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Stecoah-----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SoE*, SoF*:										
Soco---------------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Stecoah-----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
SrD*:										
Spivey	Very poor.	Very poor.	Fair	Good	Poor	Very poor.	Very poor.	Poor	Fair	Very poor.
Santeetlah	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
SrE*:										
Spivey	Very poor.	Very poor.	Fair	Good	Poor	Very poor.	Very poor.	Poor	Fair	Very poor.
Santeetlah	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
SvB Statler	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SyA*:										
Sylva	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Whiteside	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TaC*:										
Tanasee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Balsam	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TaD*:										
Tanasee	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Balsam	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TaE*:										
Tanasee	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Balsam	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TrE, TrF Trimont	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
TwC*:										
Tuckasegee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Whiteside	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ud. Udorthents, loamy										
UfB*: Udorthents.										

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
UfB*: Urban land.										
WaD: Wayah	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WaE, WaF: Wayah	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
WeC: Wayah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WeD: Wayah	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WeE, WeF: Wayah	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
WtB*: Whiteside	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Tuckasegee	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BaA: Biltmore	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
BkB2: Braddock	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
BkC2: Braddock	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
BkD2: Braddock	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
BrC*:						
Braddock	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
Urban land.						
BuD*, BuF*:						
Burton	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Craggey	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Rock outcrop.						
CaC: Cashiers	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
CaD, CaE, CaF: Cashiers	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
CdC: Chandler	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
CdD, CdE, CdF: Chandler	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
CeC: Chandler	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CeD, CeE, CeF----- Chandler	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
ChE, ChF---------- Cheoah	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CnC*:						
Chestnut----------	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty, slope.
Edneyville--------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty, slope.
CnD*, CnE*:						
Chestnut----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Edneyville--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CpD*, CpE*, CpF*:						
Cleveland---------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Chestnut----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
CrD*:						
Cowee-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Evard-------------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Urban land.						
CsD, CsE---------- Cullasaja	Severe: cutbanks cave, large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
CuC*:						
Cullasaja---------	Severe: cutbanks cave, large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones.
Tuckasegee--------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, large stones, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CuD*, CuE*, CuF*:						
Cullasaja	Severe: cutbanks cave, large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
Tuckasegee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CwA: Cullowhee	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
DfA: Dellwood	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: droughty.
DrB: Dillard	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: low strength, wetness.	Slight.
DsB: Dillsboro	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
DsC: Dillsboro	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
EdC*:						
Edneyville	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty, slope.
Chestnut	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty, slope.
EdD*, EdE*, EdF*:						
Edneyville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Chestnut	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
EgB2: Ellijay	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
EgC2: Ellijay	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
EgD2: Ellijay	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
EvC*:						
Evard	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, large stones.
Cowee	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope, depth to rock.
EvD*, EvE*, EvF*:						
Evard	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
FaC Fannin	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
FaD, FaE, FaF Fannin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
HpA Hemphill	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
JbD*, JbE*:						
Junaluska	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Brasstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
JtD*, JtE*, JtF*:						
Junaluska	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tsali	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
NkA Nikwasi	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
OcD, OcE, OcF, OwD, OwE, OwF Oconaluftee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pt*. Pits, quarries						
PwD, PwE, PwF Plott	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
RdA---------------- Reddies	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
RkF*: Rock outcrop.						
Cleveland---------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
RoA---------------- Rosman	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
SaB---------------- Saunook	Slight----------	Slight----------	Slight----------	Moderate: slope.	Moderate: low strength, frost action.	Moderate: small stones.
SaC---------------- Saunook	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: small stones, slope.
SaD, SbD----------- Saunook	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SoD*, SoE*, SoF*:						
Soco--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Stecoah-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SrD*, SrE*:						
Spivey------------	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.
Santeetlah--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SvB---------------- Statler	Slight----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
SyA*:						
Sylva-------------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Whiteside---------	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Moderate: wetness.
TaC*:						
Tanasee-----------	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Balsam------------	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
TaD*, TaE*:						
Tanasee----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Balsam-----------	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
TrE, TrF---------- Trimont	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
TwC*:						
Tuckasegee-------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, large stones, slope.
Whiteside--------	Severe: cutbanks cave, wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: wetness.
Ud. Udorthents, loamy						
UfB*:						
Udorthents.						
Urban land.						
WaD, WaE, WaF----- Wayah	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WeC--------------- Wayah	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
WeD, WeE, WeF----- Wayah	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WtB*:						
Whiteside--------	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: wetness.
Tuckasegee-------	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones, large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BaA: Biltmore	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage, too sandy.
BkB2: Braddock	Moderate: percs slowly.	Severe: seepage.	Severe: seepage, too clayey.	Slight	Poor: too clayey, hard to pack.
BkC2: Braddock	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
BkD2: Braddock	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
BrC*:					
Braddock	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Urban land.					
BuD*, BuF*:					
Burton	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Craggey	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Rock outcrop.					
CaC: Cashiers	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
CaD, CaE, CaF: Cashiers	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
CdC: Chandler	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: hard to pack.
CdD, CdE, CdF: Chandler	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: hard to pack, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CeC------------------ Chandler	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: hard to pack.
CeD, CeE, CeF------- Chandler	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: hard to pack, slope.
ChE, ChF------------ Cheoah	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: slope.
CnC*:					
Chestnut-----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
Edneyville---------	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
CnD*, CnE*:					
Chestnut-----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Edneyville---------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
CpD*, CpE*, CpF*:					
Cleveland----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Chestnut-----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Rock outcrop.					
CrD*:					
Cowee--------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Evard--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Urban land.					
CsD, CsE------------ Cullasaja	Severe: slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: seepage, large stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CuC*:					
Cullasaja----------	Severe: large stones.	Severe: seepage, slope, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: seepage, large stones.
Tuckasegee---------	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: large stones.
CuD*, CuE*, CuF*:					
Cullasaja----------	Severe: slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: seepage, large stones, slope.
Tuckasegee---------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: large stones, slope.
CwA----------------- Cullowhee	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
DfA----------------- Dellwood	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
DrB----------------- Dillard	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Fair: too clayey.
DsB----------------- Dillsboro	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
DsC----------------- Dillsboro	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
EdC*:					
Edneyville---------	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
Chestnut-----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
EdD*, EdE*, EdF*:					
Edneyville---------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Chestnut-----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EgB2----------------- Ellijay	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
EgC2----------------- Ellijay	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
EgD2----------------- Ellijay	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
EvC*:					
Evard--------------	Moderate: slope.	Severe: slope.	Moderate: slope, too sandy.	Moderate: slope.	Fair: too sandy, small stones, slope.
Cowee--------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
EvD*, EvE*, EvF*:					
Evard--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Cowee--------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
FaC------------------ Fannin	Moderate: slope, percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
FaD, FaE, FaF-------- Fannin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
HpA------------------ Hemphill	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
JbD*, JbE*:					
Junaluska----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Brasstown----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
JtD*, JtE*, JtF*:					
Junaluska----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
JtD*, JtE*, JtF*:					
Tsali	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
NkA Nikwasi	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
OcD, OcE, OcF, OwD, OwE, OwF Oconaluftee	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Pt*. Pits, quarries					
PwD, PwE, PwF Plott	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
RdA Reddies	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
RkF*: Rock outcrop.					
Cleveland	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
RoA Rosman	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
SaB Saunook	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
SaC Saunook	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
SaD, SbD Saunook	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
SoD*, SoE*, SoF*:					
Soco	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SoD*, SoE*, SoF*:					
Stecoah	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
SrD*, SrE*:					
Spivey	Severe: slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: large stones, slope.
Santeetlah	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
SvB Statler	Moderate: flooding, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: flooding.	Good.
SyA*:					
Sylva	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
Whiteside	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.
TaC*:					
Tanasee	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage, large stones.
Balsam	Severe: large stones.	Severe: seepage, slope, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: large stones.
TaD*, TaE*:					
Tanasee	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, large stones, slope.
Balsam	Severe: slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: large stones, slope.
TrE, TrF Trimont	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
TwC*:					
Tuckasegee	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: large stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
TwC*:					
Whiteside----------	Severe: wetness.	Severe: seepage, slope, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: slope, wetness.
Ud. Udorthents, loamy					
UfB*: Udorthents.					
Urban land.					
WaD, WaE, WaF------- Wayah	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
WeC----------------- Wayah	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
WeD, WeE, WeF------- Wayah	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
WtB*:					
Whiteside----------	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.
Tuckasegee---------	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BaA-------------------- Biltmore	Good-----------------	Probable-------------	Improbable: too sandy.	Poor: too sandy.
BkB2, BkC2------------ Braddock	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim, small stones.
BkD2------------------ Braddock	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim, small stones.
BrC*:				
Braddock-------------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim, small stones.
Urban land.				
BuD*:				
Burton---------------	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Craggey--------------	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones, slope.
Rock outcrop.				
BuF*:				
Burton---------------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Craggey--------------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones, slope.
Rock outcrop.				
CaC------------------- Cashiers	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CaD------------------- Cashiers	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CaE, CaF: Cashiers	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CdC: Chandler	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CdD: Chandler	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CdE, CdF: Chandler	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CeC: Chandler	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CeD: Chandler	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CeE, CeF: Chandler	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
ChE, ChF: Cheoah	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CnC*:				
Chestnut	Poor: depth to rock.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: small stones.
Edneyville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CnD*:				
Chestnut	Poor: depth to rock.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: small stones, slope.
Edneyville	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CnE*:				
Chestnut	Poor: depth to rock, slope.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: small stones, slope.
Edneyville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CpD*:				
Cleveland	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Chestnut	Poor: depth to rock.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: small stones, slope.
Rock outcrop.				
CpE*, CpF*:				
Cleveland	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Chestnut	Poor: depth to rock, slope.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: small stones, slope.
Rock outcrop.				
CrD*:				
Cowee	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Evard	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Urban land.				
CsD Cullasaja	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim, slope.
CsE Cullasaja	Poor: large stones, slope.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim, slope.
CuC*:				
Cullasaja	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim.
Tuckasegee	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CuD*:				
Cullasaja	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CuD*:				
Tuckasegee	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CuE*, CuF*:				
Cullasaja	Poor: large stones, slope.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim, slope.
Tuckasegee	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CwA: Cullowhee	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
DfA: Dellwood	Fair: large stones, wetness.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
DrB: Dillard	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
DsB, DsC: Dillsboro	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim.
EdC*:				
Edneyville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Chestnut	Poor: depth to rock.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: small stones.
EdD*:				
Edneyville	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Chestnut	Poor: depth to rock.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: small stones, slope.
EdE*, EdF*:				
Edneyville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Chestnut	Poor: depth to rock, slope.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: small stones, slope.
EgB2, EgC2: Ellijay	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
EgD2 Ellijay	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
EvC*:				
Evard	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Cowee	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
EvD*:				
Evard	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Cowee	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
EvE*, EvF*:				
Evard	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Cowee	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
FaC Fannin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
FaD Fannin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
FaE, FaF Fannin	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
HpA Hemphill	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
JbD*:				
Junaluska	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Brasstown	Fair: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
JbE*:				
Junaluska	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
JbE*:				
Brasstown	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
JtD*:				
Junaluska	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Tsali	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
JtE*, JtF*:				
Junaluska	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Tsali	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
NkA Nikwasi	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
OcD Oconaluftee	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
OcE, OcF Oconaluftee	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
OwD Oconaluftee	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
OwE, OwF Oconaluftee	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pt*. Pits, quarries				
PwD Plott	Fair: slope.	Probable	Probable	Poor: slope.
PwE, PwF Plott	Poor: slope.	Probable	Probable	Poor: slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
RdA: Reddies	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
RkF*: Rock outcrop.				
Cleveland	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
RoA: Rosman	Fair: wetness.	Probable	Probable	Fair: small stones, area reclaim.
SaB, SaC: Saunook	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
SaD, SbD: Saunook	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
SoD*: Soco	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Stecoah	Fair: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
SoE*, SoF*: Soco	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Stecoah	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
SrD*: Spivey	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Santeetlah	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
SrE*: Spivey	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
SrE*:				
Santeetlah	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
SvB Statler	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
SyA*:				
Sylva	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Whiteside	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
TaC*:				
Tanasee	Good	Probable	Probable	Poor: area reclaim, small stones.
Balsam	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim.
TaD*:				
Tanasee	Fair: slope.	Probable	Probable	Poor: area reclaim, small stones, slope.
Balsam	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim, slope.
TaE*:				
Tanasee	Poor: slope.	Probable	Probable	Poor: area reclaim, small stones, slope.
Balsam	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim, slope.
TrE, TrF Trimont	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
TwC*:				
Tuckasegee	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
TwC*:				
Whiteside	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
Ud. Udorthents, loamy				
UfB*: Udorthents.				
Urban land.				
WaD Wayah	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WaE, WaF Wayah	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WeC Wayah	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WeD Wayah	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WeE, WeF Wayah	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WtB*:				
Whiteside	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Tuckasegee	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
BaA: Biltmore	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
BkB2: Braddock	Severe: seepage.	Moderate: hard to pack.	Deep to water	Slope	Favorable	Favorable.
BkC2, BkD2: Braddock	Severe: seepage, slope.	Moderate: hard to pack.	Deep to water	Slope	Slope	Slope.
BrC*:						
Braddock	Severe: seepage, slope.	Moderate: hard to pack.	Deep to water	Slope	Slope	Slope.
Urban land.						
BuD*, BuF*:						
Burton	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Craggey	Severe: depth to rock, slope.	Severe: seepage, thin layer.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Rock outcrop.						
CaC, CaD, CaE, CaF: Cashiers	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
CdC, CdD, CdE, CdF, CeC, CeD, CeE, CeF: Chandler	Severe: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
ChE, ChF: Cheoah	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
CnC*, CnD*, CnE*:						
Chestnut	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Edneyville	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty.	Slope	Slope, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
CpD*, CpE*, CpF*:						
Cleveland	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Chestnut	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Rock outcrop.						
CrD*:						
Cowee	Severe: slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Evard	Severe: slope.	Severe: seepage, piping.	Deep to water	Slope	Slope, too sandy.	Slope.
Urban land.						
CsD, CsE Cullasaja	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, too sandy.	Large stones, slope, droughty.
CuC*, CuD*, CuE*, CuF*:						
Cullasaja	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, too sandy.	Large stones, slope, droughty.
Tuckasegee	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope, large stones.	Large stones, slope.
CwA Cullowhee	Severe: seepage.	Severe: seepage, wetness.	Flooding, large stones, cutbanks cave.	Wetness, droughty, flooding.	Wetness, too sandy.	Droughty.
DfA Dellwood	Severe: seepage.	Severe: seepage, large stones.	Flooding, large stones.	Large stones, wetness, droughty.	Large stones, wetness, too sandy.	Large stones, droughty.
DrB Dillard	Slight	Moderate: thin layer.	Slope	Slope, wetness.	Wetness	Favorable.
DsB Dillsboro	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Soil blowing	Favorable.
DsC Dillsboro	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
EdC*, EdD*, EdE*, EdF*:						
Edneyville	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty.	Slope	Slope, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
EdC*, EdD*, EdE*, EdF*:						
Chestnut	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
EgB2 Ellijay	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
EgC2, EgD2 Ellijay	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
EvC*, EvD*, EvE*, EvF*:						
Evard	Severe: slope.	Severe: seepage, piping.	Deep to water	Slope	Slope, too sandy.	Slope.
Cowee	Severe: slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
FaC, FaD, FaE, FaF Fannin	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
HpA Hemphill	Slight	Severe: hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
JbD*, JbE*:						
Junaluska	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Brasstown	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
JtD*, JtE*, JtF*:						
Junaluska	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Tsali	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
NkA Nikwasi	Severe: seepage.	Severe: seepage, wetness.	Flooding, large stones, cutbanks cave.	Wetness, droughty, flooding.	Large stones, wetness, too sandy.	Large stones, wetness, droughty.
OcD, OcE, OcF, OwD, OwE, OwF Oconaluftee	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Pt*. Pits, quarries						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
PwD, PwE, PwF----- Plott	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
RdA--------------- Reddies	Severe: seepage.	Severe: seepage.	Flooding, large stones, cutbanks cave.	Wetness, droughty.	Large stones, wetness, too sandy.	Large stones, droughty.
RkF*: Rock outcrop.						
Cleveland--------	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
RoA--------------- Rosman	Severe: seepage.	Severe: piping.	Flooding-------	Flooding, soil blowing.	Wetness, soil blowing.	Favorable.
SaB--------------- Saunook	Severe: seepage.	Severe: piping.	Deep to water	Slope----------	Favorable------	Favorable.
SaC, SaD, SbD----- Saunook	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
SoD*, SoE*, SoF*: Soco-------------	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Stecoah----------	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
SrD*, SrE*: Spivey-----------	Severe: seepage, slope.	Severe: large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
Santeetlah-------	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
SvB--------------- Statler	Severe: seepage.	Severe: piping.	Deep to water	Slope----------	Favorable------	Favorable.
SyA*: Sylva------------	Severe: seepage.	Severe: piping, wetness.	Frost action---	Wetness--------	Wetness--------	Wetness.
Whiteside--------	Severe: seepage.	Severe: piping, wetness.	Favorable------	Wetness--------	Wetness--------	Favorable.
TaC*, TaD*, TaE*: Tanasee----------	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope, soil blowing.	Slope, large stones, too sandy.	Large stones, slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
TaC*, TaD*, TaE*:						
Balsam	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
TrE, TrF Trimont	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
TwC*:						
Tuckasegee	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope, large stones.	Large stones, slope.
Whiteside	Severe: seepage, slope.	Severe: piping, wetness.	Slope	Slope, wetness.	Slope, wetness.	Slope.
Ud. Udorthents, loamy						
UfB*:						
Udorthents.						
Urban land.						
WaD, WaE, WaF, WeC, WeD, WeE, WeF Wayah	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
WtB*:						
Whiteside	Severe: seepage.	Severe: piping, wetness.	Slope	Slope, wetness.	Wetness	Favorable.
Tuckasegee	Severe: seepage.	Severe: piping.	Deep to water	Slope	Large stones	Large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
BaA--------------	0-10	Sand-------------	SM, SP-SM	A-2-4	0-5	95-100	90-100	55-88	10-35	<20	NP
Biltmore	10-60	Loamy sand, sand, fine sand.	SM, SP-SM	A-2-4	0-8	95-100	85-100	55-96	5-35	<20	NP
BkB2, BkC2, BkD2-	0-8	Clay loam--------	CL	A-6, A-7	0-5	80-100	75-100	65-95	50-85	35-50	15-26
Braddock	8-60	Clay loam, gravelly clay, clay.	CH, CL, SC, MH	A-7	0-15	80-100	65-100	55-95	40-90	42-66	15-35
BrC*:											
Braddock--------	0-8	Clay loam--------	CL	A-6, A-7	0-5	80-100	75-100	65-95	50-85	35-50	15-26
	8-60	Clay loam, gravelly clay, clay.	CH, CL, SC, MH	A-7	0-15	80-100	65-100	55-95	40-90	42-66	15-35
Urban land.											
BuD*:											
Burton----------	0-12	Cobbly sandy loam	SM	A-2, A-4, A-5	5-35	80-95	75-95	60-90	25-45	30-50	NP-7
	12-22	Cobbly sandy loam, very cobbly fine sandy loam, stony sandy loam.	SM, GM, SP-SM, SC-SM	A-2, A-1-b	10-35	45-75	40-65	35-55	10-30	25-35	NP-7
	22-36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Craggey---------	0-16	Cobbly sandy loam	SM, SC-SM	A-2, A-4, A-5	15-35	80-95	75-95	60-90	25-49	<50	NP-7
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
BuF*:											
Burton----------	0-12	Cobbly sandy loam	SM	A-2, A-4, A-5	5-35	80-95	75-95	60-90	25-45	30-50	NP-7
	12-22	Cobbly sandy loam, very cobbly fine sandy loam, stony sandy loam.	SM, GM, SP-SM, SC-SM	A-2, A-1-b	10-35	45-75	40-65	35-55	10-30	25-35	NP-7
	22-36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Craggey---------	0-16	Cobbly sandy loam	SM, SC-SM	A-2, A-4, A-5	15-35	80-95	75-95	60-90	25-49	<50	NP-7
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CaC, CaD, CaE, CaF-------------- Cashiers	0-9	Gravelly fine sandy loam.	SM, SC-SM	A-2-4, A-4, A-1, A-5	5-15	70-85	60-75	30-65	20-50	<50	NP-7
	9-48	Sandy loam, fine sandy loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2-4, A-4	0-5	70-95	60-95	50-85	25-65	<35	NP-7
	48-65	Gravelly sandy loam, gravelly fine sandy loam, sandy loam.	SM, SC-SM	A-2-4, A-4, A-1-b	0-15	70-95	60-95	30-75	20-50	<35	NP-7
CdC, CdD, CdE, CdF, CeC, CeD, CeE, CeF-------- Chandler	0-7	Gravelly fine sandy loam.	SM	A-2-4, A-4, A-1, A-5	0-15	70-85	60-75	30-65	20-50	30-50	NP-7
	7-99	Loam, fine sandy loam, sandy loam.	ML, SM, MH	A-2, A-4, A-5	0-15	90-100	85-100	60-85	25-65	30-60	NP-7
ChE, ChF--------- Cheoah	0-15	Channery loam----	SM, GM, ML, MH	A-4, A-7-5, A-5	5-15	70-95	55-90	40-80	36-65	30-64	NP-11
	15-56	Channery loam, channery fine sandy loam, channery silt loam.	SM, SC, ML, CL	A-4	5-15	70-95	55-90	40-84	36-65	25-36	NP-10
	56-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
CnC*, CnD*, CnE*: Chestnut--------	0-3	Gravelly fine sandy loam.	SM, SC-SM	A-4, A-2, A-5	5-15	75-95	65-90	60-85	30-49	<50	NP-7
	3-28	Gravelly loam, gravelly fine sandy loam, sandy loam.	SM, SC-SM	A-4, A-2, A-5	0-25	75-98	65-97	60-85	34-49	<45	NP-10
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Edneyville------	0-5	Gravelly fine sandy loam.	SM, SC-SM, ML, MH	A-2, A-4, A-5	0-10	75-95	65-80	60-75	30-52	25-61	NP-7
	5-37	Fine sandy loam, sandy loam, loam.	SM, SC-SM, ML, CL-ML	A-2, A-4, A-5	0-5	85-100	80-100	65-95	30-68	25-45	NP-10
	37-60	Sandy loam, gravelly sandy loam, fine sandy loam.	SM, SC-SM	A-2, A-4, A-5	0-10	75-100	65-100	60-88	28-49	25-45	NP-10
CpD*, CpE*, CpF*: Cleveland-------	0-5	Sandy loam-------	SM	A-2, A-4	2-5	80-95	75-90	60-80	20-50	<30	NP-3
	5-17	Sandy loam, loam	SM	A-2, A-4	2-5	80-95	75-90	60-80	20-50	<30	NP-3
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
CpD*, CpE*, CpF*:											
Chestnut--------	0-3	Gravelly fine sandy loam.	SM, SC-SM	A-4, A-2, A-5	5-15	75-95	65-90	60-85	30-49	<50	NP-7
	3-28	Gravelly loam, gravelly fine sandy loam, sandy loam.	SM, SC-SM	A-4, A-2, A-5	0-25	75-98	65-97	60-85	34-49	<45	NP-10
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
CrD*:											
Cowee-----------	0-5	Gravelly sandy loam.	SM, SC-SM, ML	A-2-4, A-4, A-5, A-2	0-15	75-95	65-85	55-75	20-51	26-41	NP-12
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam.	SC, CL, ML, SM	A-4, A-6, A-7, A-2	0-15	47-99	45-90	32-85	17-60	26-56	5-22
	27-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Evard-----------	0-6	Gravelly loam----	SM	A-2	0-15	65-85	60-80	55-75	15-35	<30	NP-4
	6-27	Sandy clay loam, clay loam, loam.	SM, SC, ML, CL	A-2, A-4, A-6, A-7-6	0-2	90-100	85-100	60-95	30-70	25-45	7-18
	27-35	Sandy loam, loam, sandy clay loam.	SC-SM, ML, CL, SC-SM	A-2, A-4	0-5	80-100	75-100	60-95	20-55	<25	NP-9
	35-60	Sandy loam, loam, loamy sand.	SM	A-2, A-4	0-15	75-100	70-100	60-90	15-50	---	NP
Urban land.											
CsD, CsE--------- Cullasaja	0-13	Very cobbly fine sandy loam.	SM, GM	A-1-b, A-2-5	30-60	55-85	50-75	35-60	15-30	41-70	NP-7
	13-60	Very stony sandy loam, very bouldery fine sandy loam, very stony loam.	SM, GM	A-1-b, A-2-4	30-60	55-85	50-75	35-60	15-30	<40	NP-7
CuC*, CuD*, CuE*, CuF*:											
Cullasaja------	0-13	Very cobbly fine sandy loam.	SM, GM	A-1-b, A-2-5	30-60	55-85	50-75	35-60	15-30	41-70	NP-7
	13-60	Very stony sandy loam, very stony fine sandy loam, very stony loam.	SM, GM	A-1-b, A-2-4	30-60	55-85	50-75	35-60	15-30	25-40	NP-7
Tuckasegee-----	0-11	Gravelly loam----	SM	A-2, A-4, A-5, A-1-b	5-15	70-85	60-75	30-65	20-50	19-50	NP-10
	11-60	Gravelly fine sandy loam, loam, gravelly loam, gravelly sandy clay loam.	SM, ML, GM	A-4	2-15	70-100	65-100	55-95	36-65	<40	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
CwA-------------- Cullowhee	0-13	Fine sandy loam	SM, ML	A-2-4, A-4	0-5	90-100	80-100	50-97	25-55	<35	NP-4
	13-23	Loamy sand, sand, gravelly loamy sand.	SM, SP-SM	A-2-4, A-1-b, A-3	0-15	70-100	65-95	30-89	2-25	---	NP
	23-35	Loamy sand, loamy fine sand, sandy loam.	SM, SP-SM	A-2-4, A-1-b	0-5	90-100	85-95	40-89	10-35	<25	NP-4
	35-65	Extremely gravelly sand, very gravelly sand, very cobbly sand.	GP-GM, GM, SM, SP-SM	A-1	10-50	13-75	10-55	6-40	1-15	---	NP
DfA-------------- Dellwood	0-16	Gravelly fine sandy loam.	SM	A-2-4, A-4, A-1-b	0-15	70-85	60-75	30-65	15-45	<37	NP-4
	16-60	Extremely gravelly sand, very gravelly sand, very gravelly loamy sand.	GM, GP-GM, GP, SP	A-1	10-25	13-75	10-55	4-40	1-15	<20	NP
DrB-------------- Dillard	0-9	Loam-------------	ML, CL	A-4	0-2	95-100	90-100	75-95	60-85	<35	NP-10
	9-70	Clay loam, sandy clay loam, loam.	CL, ML, SC	A-4, A-6, A-7	0-2	95-100	85-100	60-95	45-70	30-45	7-22
DsB, DsC--------- Dillsboro	0-10	Loam-------------	SM, SC, CL, ML	A-4, A-6, A-7-6	0-10	90-100	85-100	80-96	40-75	<42	NP-15
	10-43	Clay loam, clay	CL, CH, ML, MH	A-7	0-5	95-100	90-100	80-99	65-90	40-60	11-35
	43-59	Very cobbly clay loam, very cobbly clay, cobbly clay loam.	CL, GC, SC	A-7, A-2, A-6	20-60	50-90	40-75	30-70	20-60	35-50	11-30
	59-75	Very cobbly clay loam, cobbly clay loam, cobbly sandy clay loam.	CL, GC, SC, SM	A-7, A-2, A-6	20-60	50-90	40-85	20-65	15-60	25-50	10-25
EdC*, EdD*, EdE*, EdF*:											
Edneyville-----	0-5	Gravelly fine sandy loam.	SM, SC-SM, ML, MH	A-2, A-4, A-5	0-10	75-95	65-80	60-75	30-52	25-61	NP-7
	5-37	Fine sandy loam, sandy loam, loam.	SM, SC-SM, ML, CL-ML	A-2, A-4, A-5	0-5	85-100	80-100	65-95	30-68	25-45	NP-10
	37-60	Sandy loam, gravelly sandy loam, fine sandy loam.	SM, SC-SM	A-2, A-4, A-5	0-10	75-100	65-100	60-88	28-49	25-45	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments >3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
EdC*, EdD*, EdE*, EdF*:											
Chestnut-------	0-3	Gravelly fine sandy loam.	SM, SC-SM	A-4, A-2, A-5	5-15	75-95	65-90	60-85	30-49	<50	NP-7
	3-28	Gravelly loam, gravelly fine sandy loam, sandy loam.	SM, SC-SM	A-4, A-2, A-5	0-25	75-98	65-97	60-85	34-49	<45	NP-10
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
EgB2, EgC2, EgD2- Ellijay	0-4	Silty clay loam	ML	A-6, A-7	0-5	90-100	85-100	70-95	50-90	36-50	11-20
	4-34	Clay, clay loam, silty clay loam.	MH, ML	A-7	0-5	90-100	85-100	75-96	60-90	41-80	14-35
	34-52	Loam, clay loam, silty clay loam.	ML	A-6, A-7, A-5	0-5	90-100	85-100	70-95	50-90	36-50	9-20
	52-70	Loam, clay loam, fine sandy loam.	SM, SC, ML, CL	A-4, A-6, A-2-4	0-5	90-100	80-100	65-90	25-70	25-40	NP-15
EvC*, EvD*, EvE*, EvF*:											
Evard----------	0-6	Gravelly loam----	SM	A-2	0-15	65-85	60-80	55-75	15-35	<30	NP-4
	6-27	Sandy clay loam, clay loam, loam.	SM, SC, ML, CL	A-2, A-4, A-6, A-7-6	0-2	90-100	85-100	60-95	30-70	25-45	7-18
	27-35	Sandy loam, loam, sandy clay loam.	SC-SM, ML, CL, SC-SM	A-2, A-4	0-5	80-100	75-100	60-95	20-55	<25	NP-9
	35-60	Sandy loam, loam, loamy sand.	SM	A-2, A-4	0-15	75-100	70-100	60-90	15-50	---	NP
Cowee----------	0-5	Gravelly sandy loam.	SM, SC-SM, ML	A-2-4, A-4, A-5, A-2	0-15	75-95	65-85	55-75	20-51	26-41	NP-12
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam.	SC, CL, ML, SM	A-4, A-6, A-7, A-2	0-15	47-99	45-90	32-85	17-60	26-56	5-22
	27-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
FaC, FaD, FaE, FaF------------- Fannin	0-6	Fine sandy loam	ML, SM, MH	A-4, A-2, A-5, A-7-5	0-5	92-100	86-100	60-95	34-85	30-51	NP-18
	6-24	Clay loam, sandy clay loam, loam.	ML, MH, SM	A-4, A-7, A-6	2-10	97-100	90-100	67-95	40-85	30-55	5-23
	24-60	Loam, sandy loam, fine sandy loam.	SM, ML	A-2, A-4, A-5	0-15	75-100	70-98	60-90	15-70	30-50	NP-10
HpA-------------- Hemphill	0-13	Clay loam--------	CL, CH	A-6, A-7	0	95-100	95-100	85-100	60-90	30-52	11-25
	13-38	Clay, silty clay, clay loam.	CL, CH, MH, ML	A-6, A-7	0	95-100	95-100	85-100	65-95	30-60	11-29
	38-64	Fine sandy loam, loam, clay loam.	SM, SC-SM, CL-ML, ML	A-4, A-5, A-6, A-7	0	95-100	90-100	65-100	40-90	25-50	NP-16
	64-80	Variable---------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
JbD*, JbE*:											
Junaluska-------	0-3	Channery fine sandy loam.	SM, ML, MH, GM	A-4, A-5, A-2-4, A-7	5-15	70-96	55-91	40-80	30-55	29-56	NP-14
	3-28	Channery loam, channery clay loam, sandy clay loam.	CL, ML, SC, SM	A-6, A-7	5-15	75-100	60-100	55-95	40-73	29-50	10-20
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Brasstown-------	0-4	Channery fine sandy loam.	SM, GM, ML, MH	A-4, A-5, A-7-5	2-15	70-95	70-90	40-80	35-55	30-57	NP-14
	4-45	Channery loam, channery sandy clay loam, sandy clay loam.	CL, ML, SC, SM	A-6, A-7-6	2-15	75-100	70-100	55-97	40-73	35-50	11-20
	45-50	Channery fine sandy loam, channery very fine sandy loam, loam.	SM, GM, ML	A-4	2-15	70-100	70-100	40-96	35-55	25-35	NP-10
	50-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
JtD*, JtE*, JtF*:											
Junaluska-------	0-3	Channery fine sandy loam.	SM, ML, MH, GM	A-4, A-5, A-2-4, A-7	5-15	70-96	55-91	40-80	30-55	29-56	NP-14
	3-28	Channery loam, channery clay loam, sandy clay loam.	CL, ML, SC, SM	A-6, A-7	5-15	75-100	60-100	55-95	40-73	29-50	10-20
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Tsali-----------	0-6	Channery fine sandy loam.	SM, ML	A-4, A-5	5-15	70-95	55-90	40-80	35-55	30-50	NP-10
	6-16	Channery sandy clay loam, channery loam, channery clay loam.	CL, ML, SC, SM	A-6, A-7	5-15	75-95	60-90	55-80	40-70	30-50	11-20
	16-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
NkA-------------- Nikwasi	0-26	Fine sandy loam	SM, ML	A-2-4, A-4	0-5	90-100	80-99	50-93	17-55	<37	NP-4
	26-60	Extremely gravelly coarse sand, very gravelly sand, very cobbly loamy sand.	GP-GM, GM, SM, SP-SM	A-1	10-50	25-75	10-55	7-40	1-15	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
OcD, OcE, OcF, OwD, OwE, OwF--- Oconaluftee	0-8	Channery loam----	SM, ML, GM	A-4, A-5	5-15	70-95	55-90	40-80	36-65	30-75	NP-7
	8-19	Channery loam, channery silt loam, channery fine sandy loam.	SM, ML, GM	A-4, A-5	5-15	70-95	55-90	40-80	36-65	30-45	NP-7
	19-35	Channery loam, fine sandy loam, channery fine sandy loam.	SM, SC, ML, CL	A-4, A-5	5-15	70-100	55-100	40-94	36-77	25-45	NP-10
	35-67	Channery loam, fine sandy loam, channery fine sandy loam.	SM, SC, ML, CL	A-4, A-5	5-15	70-100	55-100	40-91	36-69	25-45	NP-10
Pt*. Pits, quarries											
PwD, PwE, PwF---- Plott	0-8	Fine sandy loam	SM, ML, MH	A-2, A-4, A-5	0-5	90-100	80-99	50-85	25-70	30-67	NP-7
	8-18	Loam, gravelly fine sandy loam, sandy loam, gravelly loam.	SM, SC-SM, ML, CL-ML	A-2, A-4, A-5, A-1-b	0-10	70-100	60-95	30-85	20-70	25-44	NP-10
	18-60	Gravelly fine sandy loam, cobbly sandy loam, cobbly fine sandy loam.	SM, SC-SM, SP-SM, GM	A-2-4, A-1-b	5-15	58-92	56-89	20-72	10-30	25-36	NP-7
RdA-------------- Reddies	0-14	Fine sandy loam	SM, ML	A-2-4, A-4	0-5	90-100	80-100	50-95	25-55	25-37	NP-7
	14-26	Fine sandy loam, sandy loam, gravelly sandy loam.	SM, ML	A-2-4, A-4, A-1-b	0-15	70-100	60-95	30-85	15-55	25-35	NP-7
	26-60	Extremely gravelly sand, very gravelly sand, very cobbly sand.	GM, GP-GM, SM, SP-SM	A-1	10-50	13-75	10-55	4-40	1-15	<25	NP
RkF*: Rock outcrop.											
Cleveland-------	0-5	Sandy loam-------	SM	A-2, A-4	2-5	80-95	75-90	60-80	20-50	<30	NP-3
	5-17	Loam, sandy loam.	SM	A-2, A-4	2-5	80-95	75-90	60-80	20-50	<30	NP-3
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
RoA-------------- Rosman	0-13	Fine sandy loam	ML, SM, SC-SM	A-2-4, A-4, A-2-5, A-5	0	95-100	90-100	75-100	30-60	<41	NP-7
	13-73	Loam, fine sandy loam, sandy loam.	ML, SM, SC-SM	A-2-4, A-4	0	95-100	90-100	75-100	30-85	<39	NP-8

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
SaB, SaC, SaD, SbD------------- Saunook	0-9	Gravelly loam----	SM, MH, ML	A-2, A-4, A-1, A-5	5-15	70-85	60-75	30-65	20-55	30-59	NP-14
	9-24	Gravelly sandy clay loam, gravelly clay loam, cobbly loam.	SC, CL, ML, GM	A-4, A-6, A-2-4, A-2-6	5-25	55-99	55-97	45-83	30-55	25-45	7-17
	24-60	Sandy loam, cobbly fine sandy loam, gravelly sandy loam.	SM, GM	A-4, A-1-b, A-2-4	15-35	55-80	55-80	30-75	20-50	25-40	NP-10
SoD*, SoE*, SoF*: Soco------------	0-4	Channery loam----	SM, ML, GM, MH	A-4, A-5	5-15	70-96	55-92	40-83	36-65	20-55	NP-7
	4-24	Loam, fine sandy loam, silt loam.	SM, SC, ML, CL	A-4, A-6	0-5	85-100	80-100	65-92	36-77	25-40	NP-11
	24-35	Channery loam, channery fine sandy loam, channery silt loam.	SM, SC, ML, CL	A-4, A-6	5-15	70-95	55-91	40-91	35-65	25-40	NP-11
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Stecoah---------	0-5	Channery fine sandy loam.	SM, ML, GM, MH	A-4, A-5	5-15	70-96	55-92	40-83	36-65	30-55	NP-7
	5-22	Channery loam, channery fine sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0-15	70-100	55-100	40-94	36-77	25-40	NP-12
	22-45	Channery loam, channery fine sandy loam, loam.	SM, SC, ML, CL	A-4	5-15	70-100	55-100	40-91	35-69	24-40	NP-10
	45-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
SrD*, SrE*: Spivey----------	0-13	Flaggy loam------	SM, GM, ML	A-4, A-5	15-30	70-95	65-85	40-80	36-65	15-45	NP-10
	13-60	Flaggy loam, very flaggy loam, very flaggy fine sandy loam.	SM, GM	A-1, A-2, A-4	20-60	55-85	40-75	30-60	20-50	25-40	NP-10
Santeetlah------	0-12	Flaggy loam------	SM, ML, GM, MH	A-4, A-5	15-25	70-95	65-85	40-80	36-65	30-74	NP-7
	12-28	Loam, fine sandy loam, silt loam.	SM, ML	A-4, A-6, A-7-6	0-5	85-100	80-100	65-90	36-75	25-41	NP-11
	28-60	Channery loam, channery fine sandy loam, channery silt loam.	SM, ML, GM	A-4	5-15	70-95	55-90	40-80	36-65	25-40	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag-ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
SvB-------------- Statler	0-9	Loam-------------	ML, CL-ML, CL	A-4, A-6	0	95-100	75-100	70-100	53-75	25-37	3-14
	9-30	Clay loam, silt loam, loam.	CL, CL-ML	A-4, A-6	0	95-100	75-100	70-100	60-80	25-52	5-27
	30-62	Loam, clay loam, sandy clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0-5	95-100	75-100	65-98	50-75	25-52	5-27
	62-85	Loam, fine sandy loam, clay loam.	CL-ML, CL, SC-SM, SC	A-4	0-10	90-100	65-100	55-95	40-75	25-40	4-27
SyA*:											
Sylva-----------	0-8	Loam-------------	SM, ML	A-2, A-4, A-5	0-5	90-100	80-100	50-90	25-55	30-50	NP-10
	8-37	Fine sandy loam, sandy loam, loam.	SM, ML, SC-SM, CL-ML	A-2, A-4	0-5	90-100	80-100	50-90	25-55	25-40	NP-10
	37-65	Fine sandy loam, sandy loam, loam.	SM, ML, SC-SM, CL-ML	A-2, A-4	0-5	90-100	80-100	50-90	23-55	25-40	NP-10
Whiteside-------	0-14	Fine sandy loam	SM, ML	A-2, A-4, A-5	0-5	90-100	80-100	50-87	25-55	30-50	NP-10
	14-47	Sandy clay loam, loam, fine sandy loam.	SM, ML, SC	A-2, A-4, A-6, A-5	0-5	90-100	80-100	50-90	30-56	30-50	4-15
	47-53	Loamy sand, loamy fine sand, sandy loam.	SM, SP-SM	A-2-4, A-1-b	0-5	88-100	80-100	40-75	10-35	22-30	NP-4
	53-70	Sandy clay loam, fine sandy loam, sandy loam.	ML, SM, CL-ML, SC-SM	A-2-4, A-4	0-5	90-100	80-100	50-85	25-60	25-40	NP-10
TaC*, TaD*, TaE*:											
Tanasee---------	0-7	Sandy loam-------	SM, ML, MH	A-2-4, A-4, A-5	0-5	90-100	80-95	50-85	25-60	30-60	NP-7
	7-13	Gravelly sandy loam, sandy loam, loam.	SM, ML	A-2-4, A-4, A-1, A-5	0-15	70-100	60-95	30-85	20-60	30-50	NP-7
	13-31	Gravelly sandy loam, sandy loam, loam.	SM, SC-SM, ML, CL-ML	A-2-4, A-4, A-1, A-5	0-15	70-100	60-95	30-85	20-60	25-50	NP-7
	31-65	Gravelly loamy sand, cobbly loamy coarse sand, very stony sandy loam.	SM, SP-SM, SC-SM	A-2-4, A-1-b	0-50	70-85	60-75	20-50	10-30	20-40	NP-7

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
TaC*, TaD*, TaE*: Balsam----------	0-13	Stony sandy loam	SM	A-1-b, A-2-5, A-5	15-37	75-91	70-85	30-75	20-49	41-70	NP-7
	13-22	Very cobbly sandy loam, very stony sandy loam, very cobbly loam.	GM, SM	A-1-b, A-2-4	30-60	51-85	45-75	34-60	15-35	<40	NP-7
	22-48	Very cobbly fine sandy loam, very stony loam, very stony fine sandy loam.	GM, SM	A-1-b, A-2-4	30-60	51-85	45-75	34-60	15-35	<40	NP-7
	48-65	Very cobbly sandy loam, very stony coarse sandy loam, very stony loam.	GP-GM, GM, SP-SM, SM	A-1, A-3, A-2-4	30-60	33-85	23-75	14-60	5-25	<40	NP-7
TrE, TrF--------- Trimont	0-10	Gravelly loam----	SM, ML	A-2-4, A-4, A-1, A-5	5-15	70-85	60-75	30-65	20-55	30-51	NP-10
	10-40	Clay loam, sandy clay loam, loam.	SC, CL, ML, SM	A-4, A-6, A-7	0-5	90-100	85-100	75-90	35-65	25-51	6-18
	40-65	Gravelly sandy loam, loam, sandy loam.	SM, ML, CL, SC	A-2-4, A-4, A-1, A-5	0-15	70-100	60-100	30-85	20-65	25-50	NP-16
TwC*: Tuckasegee------	0-11	Gravelly loam----	SM	A-2, A-4, A-5, A-1-b	5-15	70-85	60-75	30-65	20-50	19-50	NP-10
	11-60	Gravelly fine sandy loam, loam, sandy loam, gravelly loam, gravelly sandy clay loam.	SM, ML, GM	A-4	2-15	70-100	65-100	55-95	36-65	<40	NP-10
Whiteside-------	0-14	Fine sandy loam	SM, ML	A-2, A-4, A-5	0-5	90-100	80-100	50-87	25-55	30-50	NP-10
	14-47	Sandy clay loam, loam, fine sandy loam.	SM, ML, SC	A-2, A-4, A-6, A-5	0-5	90-100	80-100	50-90	30-56	30-50	4-15
	47-53	Loamy sand, loamy fine sand, sandy loam.	SM, SP-SM	A-2-4, A-1-b	0-5	88-100	80-100	40-75	10-35	22-30	NP-4
	53-70	Sandy clay loam, fine sandy loam, sandy loam.	ML, SM, CL-ML, SC-SM	A-2-4, A-4	0-5	90-100	80-100	50-85	25-60	25-40	NP-10
Ud. Udorthents, loamy											
UfB*: Udorthents.											
Urban land.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
WaD, WaE, WaF, WeC, WeD, WeE, WeF: Wayah	0-14	Sandy loam	SM, ML	A-2, A-4, A-5	0-5	90-100	80-98	50-88	25-65	30-50	NP-10
	14-40	Gravelly loam, sandy loam, gravelly sandy loam.	SM, SC-SM, GM, ML	A-2-4, A-4, A-1-b	3-15	53-99	50-97	30-87	20-55	25-35	NP-10
	40-65	Gravelly fine sandy loam, gravelly sandy loam, gravelly loamy sand.	SM, SP-SM, GM, GP-GM	A-2-4, A-1-b, A-4	3-15	53-87	50-80	20-50	10-30	20-35	NP-4
WtB*: Whiteside	0-14	Fine sandy loam	SM, ML	A-2, A-4, A-5	0-5	90-100	80-100	50-87	25-55	30-50	NP-10
	14-47	Sandy clay loam, loam, fine sandy loam.	SM, ML, SC	A-2, A-4, A-6, A-5	0-5	90-100	80-100	50-90	30-56	30-50	4-15
	47-53	Loamy sand, loamy fine sand, sandy loam.	SM, SP-SM	A-2-4, A-1-b	0-5	88-100	80-100	40-75	10-35	22-30	NP-4
	53-70	Sandy clay loam, fine sandy loam, sandy loam.	ML, SM, CL-ML, SC-SM	A-2-4, A-4	0-5	90-100	80-100	50-85	25-60	25-40	NP-10
Tuckasegee	0-11	Gravelly loam	SM	A-2, A-4, A-5, A-1-b	5-15	70-85	60-75	30-65	20-50	19-50	NP-10
	11-60	Gravelly fine sandy loam, loam, sandy loam, gravelly loam, gravelly sandy clay loam.	SM, ML, GM	A-4	2-15	70-100	65-100	55-95	36-65	<40	NP-10

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
BaA---------------	0-10	0-9	1.20-1.65	6.0-20	0.07-0.11	5.1-7.8	Low-----------	0.10	5	2	.5-3
Biltmore	10-60	0-12	1.20-1.70	6.0-20	0.06-0.10	5.1-7.8	Low-----------	0.10			
BkB2, BkC2, BkD2-	0-8	27-40	1.20-1.50	0.6-2.0	0.14-0.19	3.6-5.5	Low-----------	0.32	3	8	.5-1
Braddock	8-60	35-55	1.20-1.50	0.6-2.0	0.12-0.17	3.6-5.5	Moderate------	0.24			
BrC*:											
Braddock---------	0-8	27-40	1.20-1.50	0.6-2.0	0.14-0.19	3.6-5.5	Low-----------	0.32	3	8	.5-1
	8-60	35-55	1.20-1.50	0.6-2.0	0.12-0.17	3.6-5.5	Moderate------	0.24			
Urban land.											
BuD*:											
Burton-----------	0-12	5-18	1.10-1.30	2.0-6.0	0.11-0.16	3.6-6.0	Low-----------	0.15	2	8	8-20
	12-22	5-18	1.45-1.65	2.0-6.0	0.07-0.12	3.6-6.0	Low-----------	0.15			
	22-36	---	---	---	---	---	--------------	----			
Craggey----------	0-16	8-20	1.10-1.30	2.0-6.0	0.10-0.15	3.6-6.0	Low-----------	0.15	1	8	8-20
	16	---	---	---	---	---	--------------	----			
Rock outcrop.											
BuF*:											
Burton-----------	0-12	5-18	1.10-1.30	2.0-6.0	0.11-0.16	3.6-6.0	Low-----------	0.15	2	8	8-20
	12-22	5-18	1.45-1.65	2.0-6.0	0.07-0.12	3.6-6.0	Low-----------	0.15			
	22-36	---	---	---	---	---	--------------	----			
Craggey----------	0-16	8-20	1.10-1.30	2.0-6.0	0.10-0.15	3.6-6.0	Low-----------	0.15	1	8	8-20
	16	---	---	---	---	---	--------------	----			
Rock outcrop.											
CaC, CaD, CaE, CaF--------------	0-9	5-18	1.30-1.50	2.0-6.0	0.11-0.15	4.5-6.0	Low-----------	0.28	4	3	5-10
Cashiers	9-48	5-18	1.30-1.50	2.0-6.0	0.13-0.18	4.5-6.0	Low-----------	0.32			
	48-65	5-18	1.30-1.50	2.0-6.0	0.10-0.14	4.5-6.0	Low-----------	0.32			
CdC, CdD, CdE, CdF, CeC, CeD, CeE, CeF--------	0-7	5-18	1.30-1.50	2.0-6.0	0.10-0.14	4.5-6.0	Low-----------	0.28	3	3	1-8
Chandler	7-99	5-18	1.30-1.50	2.0-6.0	0.11-0.15	4.5-6.0	Low-----------	0.32			
ChE, ChF---------	0-15	5-18	1.35-1.60	2.0-6.0	0.12-0.18	3.6-5.5	Low-----------	0.15	3	5	5-10
Cheoah	15-56	5-18	1.35-1.60	2.0-6.0	0.11-0.17	3.6-6.0	Low-----------	0.20			
	56-60	---	---	---	---	---	--------------	----			
CnC*, CnD*, CnE*:											
Chestnut---------	0-3	5-20	1.35-1.60	2.0-6.0	0.08-0.12	3.6-6.0	Low-----------	0.17	2	5	1-8
	3-28	5-25	1.35-1.60	2.0-6.0	0.08-0.12	3.6-6.0	Low-----------	0.15			
	28-60	---	---	---	---	---	--------------	----			
Edneyville-------	0-5	5-18	1.40-1.60	2.0-6.0	0.08-0.13	4.5-6.0	Low-----------	0.17	4	5	1-8
	5-37	7-20	1.40-1.60	2.0-6.0	0.10-0.16	4.5-6.0	Low-----------	0.20			
	37-60	5-20	1.40-1.60	2.0-6.0	0.08-0.14	4.5-6.0	Low-----------	0.20			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
CpD*, CpE*, CpF*:											
Cleveland-------	0-5	6-20	1.20-1.50	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.24	1	3	.5-8
	5-17	6-20	1.20-1.50	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.24			
	17	---	---	---	---	---	-------------	----			
Chestnut--------	0-3	5-20	1.35-1.60	2.0-6.0	0.08-0.12	3.6-6.0	Low----------	0.17	2	5	1-8
	3-28	5-25	1.35-1.60	2.0-6.0	0.08-0.12	3.6-6.0	Low----------	0.15			
	28-60	---	---	---	---	---	-------------	----			
Rock outcrop.											
CrD*:											
Cowee-----------	0-5	8-20	1.25-1.60	2.0-6.0	0.10-0.15	3.6-6.0	Low----------	0.20	2	5	1-5
	5-27	18-35	1.30-1.60	0.6-2.0	0.12-0.18	3.6-6.0	Low----------	0.24			
	27-60	---	---	---	---	---	-------------	----			
Evard-----------	0-6	5-20	1.20-1.50	2.0-6.0	0.08-0.14	4.5-6.0	Low----------	0.15	5	8	1-5
	6-27	18-35	1.30-1.50	0.6-2.0	0.15-0.18	4.5-6.0	Low----------	0.24			
	27-35	12-20	1.20-1.40	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.24			
	35-60	5-20	1.20-1.40	0.6-2.0	0.05-0.17	4.5-6.0	Low----------	0.24			
Urban land.											
CsD, CsE--------- Cullasaja	0-13	5-20	0.50-1.20	2.0-6.0	0.09-0.12	4.5-6.0	Low----------	0.05	5	8	5-18
	13-60	5-20	1.00-1.60	2.0-6.0	0.07-0.10	4.5-6.0	Low----------	0.05			
CuC*, CuD*, CuE*, CuF*:											
Cullasaja------	0-13	5-20	0.50-1.20	2.0-6.0	0.09-0.12	4.5-6.5	Low----------	0.05	5	8	5-18
	13-60	5-20	1.00-1.60	2.0-6.0	0.07-0.10	4.5-6.0	Low----------	0.05			
Tuckasegee-----	0-11	12-27	0.85-1.20	2.0-6.0	0.12-0.17	4.5-6.5	Low----------	0.20	5	5	4-15
	11-60	12-27	1.00-1.40	2.0-6.0	0.11-0.21	4.5-6.0	Low----------	0.20			
CwA-------------- Cullowhee	0-13	5-18	1.30-1.50	2.0-6.0	0.12-0.18	4.5-6.5	Low----------	0.20	3	3	3-10
	13-23	2-8	1.35-1.55	>6.0	0.05-0.08	4.5-6.5	Low----------	0.10			
	23-35	5-12	1.35-1.55	>6.0	0.05-0.10	4.5-6.5	Low----------	0.10			
	35-65	1-5	1.40-1.60	>6.0	0.02-0.05	4.5-6.5	Low----------	0.05			
DfA-------------- Dellwood	0-16	5-15	1.30-1.50	2.0-6.0	0.08-0.12	4.5-7.3	Low----------	0.10	2	3	3-8
	16-60	1-8	1.40-1.60	>6.0	0.02-0.05	4.5-7.3	Low----------	0.05			
DrB-------------- Dillard	0-9	10-25	1.20-1.50	0.6-2.0	0.15-0.20	5.1-6.0	Low----------	0.32	4	5	.5-5
	9-70	18-35	1.40-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28			
DsB, DsC--------- Dillsboro	0-10	10-27	1.00-1.70	2.0-6.0	0.11-0.20	4.5-7.3	Low----------	0.20	5	3	2-8
	10-43	35-60	1.20-1.60	0.6-2.0	0.17-0.19	4.5-7.3	Moderate-----	0.28			
	43-59	35-60	1.20-1.60	0.6-2.0	0.08-0.14	4.5-6.0	Moderate-----	0.10			
	59-75	20-35	1.20-1.60	0.6-2.0	0.08-0.14	4.5-6.0	Low----------	0.10			
EdC*, EdD*, EdE*, EdF*:											
Edneyville-----	0-5	5-18	1.40-1.60	2.0-6.0	0.08-0.13	4.5-6.0	Low----------	0.17	4	5	1-8
	5-37	7-20	1.40-1.60	2.0-6.0	0.10-0.16	4.5-6.0	Low----------	0.20			
	37-60	5-20	1.40-1.60	2.0-6.0	0.08-0.14	4.5-6.0	Low----------	0.20			
Chestnut-------	0-3	5-20	1.35-1.60	2.0-6.0	0.08-0.12	3.6-6.0	Low----------	0.17	2	5	1-8
	3-28	5-25	1.35-1.60	2.0-6.0	0.08-0.12	3.6-6.0	Low----------	0.15			
	28-60	---	---	---	---	---	-------------	----			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
EgB2, EgC2, EgD2- Ellijay	0-4	27-40	1.00-1.30	0.6-2.0	0.15-0.20	4.5-7.3	Low----------	0.28	3	6	1-5
	4-34	35-60	1.00-1.30	0.6-2.0	0.15-0.20	5.1-7.3	Moderate-----	0.28			
	34-52	20-35	1.00-1.30	0.6-2.0	0.15-0.20	5.1-7.3	Low----------	0.28			
	52-70	8-30	1.00-1.30	0.6-2.0	0.10-0.15	5.1-7.3	Low----------	0.28			
EvC*, EvD*, EvE*, EvF*:											
Evard----------	0-6	5-20	1.20-1.50	2.0-6.0	0.08-0.14	4.5-6.0	Low----------	0.15	5	8	1-5
	6-27	18-35	1.30-1.50	0.6-2.0	0.15-0.18	4.5-6.0	Low----------	0.24			
	27-35	12-20	1.20-1.40	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.24			
	35-60	5-20	1.20-1.40	0.6-2.0	0.05-0.17	4.5-6.0	Low----------	0.24			
Cowee----------	0-5	8-20	1.25-1.60	2.0-6.0	0.10-0.15	3.6-6.0	Low----------	0.20	2	5	1-5
	5-27	18-35	1.30-1.60	0.6-2.0	0.12-0.18	3.6-6.0	Low----------	0.24			
	27-60	---	---	---	---	---	-------------	----			
FaC, FaD, FaE, FaF------------- Fannin	0-6	5-25	1.30-1.50	2.0-6.0	0.12-0.18	4.5-6.5	Low----------	0.32	3	5	1-5
	6-24	18-35	1.30-1.50	0.6-2.0	0.11-0.17	4.5-6.5	Low----------	0.24			
	24-60	5-25	1.30-1.50	0.6-2.0	0.08-0.12	4.5-6.5	Low----------	0.24			
HpA-------------- Hemphill	0-13	27-40	1.20-1.45	0.2-0.6	0.16-0.22	4.5-7.3	Moderate-----	0.28	5	6	3-10
	13-38	35-60	1.20-1.45	0.06-0.2	0.15-0.20	4.5-7.3	High---------	0.28			
	38-64	8-35	1.20-1.45	0.2-0.6	0.12-0.20	4.5-7.3	Low----------	0.24			
	64-80	---	---	---	---	---	-------------	----			
JbD*, JbE*:											
Junaluska-------	0-3	5-18	1.35-1.60	2.0-6.0	0.10-0.15	3.6-6.0	Low----------	0.15	2	5	1-5
	3-28	18-35	1.30-1.65	0.6-2.0	0.12-0.18	3.6-6.0	Low----------	0.15			
	28-60	---	---	---	---	---	-------------	----			
Brasstown-------	0-4	5-18	1.00-1.40	2.0-6.0	0.10-0.15	3.6-6.0	Low----------	0.15	3	5	1-5
	4-45	18-35	1.35-1.60	0.6-2.0	0.12-0.18	3.6-6.0	Low----------	0.15			
	45-50	8-20	1.40-1.65	0.6-2.0	0.10-0.15	3.6-6.0	Low----------	0.15			
	50-60	---	---	---	---	---	-------------	----			
JtD*, JtE*, JtF*:											
Junaluska-------	0-3	5-18	1.35-1.60	2.0-6.0	0.10-0.15	3.6-6.0	Low----------	0.15	2	5	1-5
	3-28	18-35	1.30-1.65	0.6-2.0	0.12-0.18	3.6-6.0	Low----------	0.15			
	28-60	---	---	---	---	---	-------------	----			
Tsali-----------	0-6	5-20	1.35-1.60	2.0-6.0	0.10-0.15	3.6-6.0	Low----------	0.15	1	5	1-5
	6-16	18-35	1.30-1.50	0.6-2.0	0.12-0.18	3.6-6.0	Low----------	0.15			
	16-40	---	---	---	---	---	-------------	----			
NkA-------------- Nikwasi	0-26	5-18	1.30-1.50	2.0-6.0	0.13-0.20	4.5-6.5	Low----------	0.20	3	3	5-12
	26-60	1-5	1.40-1.60	>6.0	0.02-0.05	4.5-6.5	Low----------	0.05			
OcD, OcE, OcF, OwD, OwE, OwF--- Oconaluftee	0-8	5-18	1.00-1.30	2.0-6.0	0.13-0.18	3.6-5.5	Low----------	0.15	3	5	8-20
	8-19	5-18	1.20-1.50	2.0-6.0	0.12-0.18	3.6-5.5	Low----------	0.15			
	19-35	5-18	1.20-1.50	2.0-6.0	0.11-0.17	3.6-6.0	Low----------	0.20			
	35-67	5-18	1.35-1.60	2.0-6.0	0.11-0.17	3.6-6.0	Low----------	0.20			
Pt*. Pits, quarries											
PwD, PwE, PwF---- Plott	0-8	4-18	1.00-1.20	2.0-6.0	0.18-0.28	3.6-6.0	Low----------	0.24	4	5	5-15
	8-18	5-20	1.20-1.40	2.0-6.0	0.14-0.24	4.5-6.0	Low----------	0.24			
	18-60	2-18	1.20-1.60	2.0-6.0	0.05-0.20	4.5-6.0	Low----------	0.15			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
RdA-------------- Reddies	0-14	5-18	1.30-1.50	2.0-6.0	0.10-0.18	4.5-7.3	Low-----------	0.20	3	3	3-8
	14-26	5-18	1.35-1.55	2.0-6.0	0.08-0.15	4.5-7.3	Low-----------	0.10			
	26-60	1-5	1.40-1.60	>6.0	0.02-0.05	4.5-7.3	Low-----------	0.05			
RkF*:											
Rock outcrop.											
Cleveland--------	0-5	6-20	1.20-1.50	2.0-6.0	0.08-0.12	4.5-6.0	Low-----------	0.24	1	3	.5-8
	5-17	6-20	1.20-1.50	2.0-6.0	0.08-0.12	4.5-6.0	Low-----------	0.24			
	17	---	---	---	---	---	-------------	----			
RoA-------------- Rosman	0-13	8-18	1.25-1.40	2.0-6.0	0.12-0.18	5.1-6.5	Low-----------	0.24	5	3	2-8
	13-73	8-18	1.25-1.50	2.0-6.0	0.10-0.18	5.1-6.5	Low-----------	0.24			
SaB, SaC, SaD, SbD------------- Saunook	0-9	7-20	1.35-1.60	2.0-6.0	0.10-0.15	3.6-6.0	Low-----------	0.15	5	5	3-10
	9-24	18-35	1.30-1.50	0.6-2.0	0.09-0.15	4.5-6.5	Low-----------	0.15			
	24-60	7-20	1.35-1.60	2.0-6.0	0.07-0.12	4.5-6.5	Low-----------	0.15			
SoD*, SoE*, SoF*:											
Soco-------------	0-4	5-18	1.35-1.60	2.0-6.0	0.11-0.17	3.6-5.5	Low-----------	0.15	2	5	1-8
	4-24	5-18	1.35-1.60	2.0-6.0	0.12-0.20	3.6-5.5	Low-----------	0.32			
	24-35	5-18	1.40-1.65	2.0-6.0	0.09-0.15	3.6-5.5	Low-----------	0.15			
	35-60	---	---	---	---	---	-------------	----			
Stecoah----------	0-5	5-18	1.35-1.60	2.0-6.0	0.11-0.17	3.6-5.5	Low-----------	0.15	3	5	1-8
	5-22	5-18	1.35-1.60	2.0-6.0	0.10-0.17	3.6-5.5	Low-----------	0.32			
	22-45	5-18	1.40-1.65	2.0-6.0	0.10-0.15	3.6-5.5	Low-----------	0.15			
	45-60	---	---	---	---	---	-------------	----			
SrD*, SrE*:											
Spivey-----------	0-13	5-20	1.20-1.40	0.6-6.0	0.10-0.16	3.6-6.0	Low-----------	0.17	5	8	5-18
	13-60	5-20	1.30-1.50	0.6-6.0	0.07-0.11	3.6-6.0	Low-----------	0.05			
Santeetlah-------	0-12	5-18	1.20-1.40	2.0-6.0	0.12-0.18	3.6-6.0	Low-----------	0.15	5	8	5-10
	12-28	5-18	1.30-1.50	2.0-6.0	0.14-0.22	3.6-6.0	Low-----------	0.32			
	28-60	5-18	1.35-1.55	2.0-6.0	0.11-0.17	3.6-6.0	Low-----------	0.20			
SvB-------------- Statler	0-9	10-20	1.35-1.45	0.6-2.0	0.18-0.22	5.1-7.3	Low-----------	0.32	5	5	2-6
	9-30	18-35	1.35-1.50	0.6-2.0	0.17-0.20	5.1-6.5	Low-----------	0.24			
	30-62	15-35	1.35-1.50	0.6-2.0	0.17-0.20	5.1-6.0	Low-----------	0.24			
	62-85	12-30	1.35-1.50	0.6-6.0	0.14-0.18	5.1-6.0	Low-----------	0.24			
SyA*:											
Sylva------------	0-8	5-18	1.30-1.50	2.0-6.0	0.16-0.24	3.6-5.5	Low-----------	0.24	5	5	4-10
	8-37	5-18	1.35-1.55	2.0-6.0	0.14-0.20	3.6-5.5	Low-----------	0.24			
	37-65	5-27	1.35-1.55	0.6-6.0	0.14-0.20	3.6-5.5	Low-----------	0.24			
Whiteside--------	0-14	5-18	1.30-1.50	2.0-6.0	0.15-0.22	4.5-7.3	Low-----------	0.24	5	5	2-8
	14-47	18-27	1.35-1.55	0.6-2.0	0.14-0.20	4.5-6.0	Low-----------	0.24			
	47-53	3-10	1.40-1.60	2.0-6.0	0.04-0.11	4.5-6.0	Low-----------	0.15			
	53-70	8-35	1.35-1.60	0.6-6.0	0.10-0.16	4.5-6.0	Low-----------	0.24			
TaC*, TaD*, TaE*:											
Tanasee----------	0-7	5-18	1.10-1.30	2.0-6.0	0.16-0.22	3.6-5.5	Low-----------	0.24	5	3	8-20
	7-13	5-18	1.35-1.60	2.0-6.0	0.12-0.18	3.6-5.5	Low-----------	0.20			
	13-31	5-18	1.35-1.60	2.0-6.0	0.10-0.16	4.5-5.5	Low-----------	0.15			
	31-65	1-6	1.40-1.65	2.0-6.0	0.05-0.09	4.5-5.5	Low-----------	0.10			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
TaC*, TaD*, TaE*:											
Balsam----------	0-13	4-20	0.50-1.00	2.0-6.0	0.20-0.25	3.6-6.0	Low----------	0.10	5	8	8-20
	13-22	4-18	1.00-1.50	2.0-6.0	0.06-0.10	3.6-6.0	Low----------	0.05			
	22-48	4-18	1.00-1.50	2.0-6.0	0.06-0.10	3.6-6.0	Low----------	0.05			
	48-65	2-15	1.20-1.60	2.0-6.0	0.04-0.09	3.6-6.0	Low----------	0.05			
TrE, TrF---------	0-10	8-20	1.35-1.60	2.0-6.0	0.10-0.15	4.5-6.0	Low----------	0.15	4	5	3-9
Trimont	10-40	18-35	1.30-1.50	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.24			
	40-65	8-20	1.40-1.65	0.6-2.0	0.10-0.15	4.5-6.0	Low----------	0.15			
TwC*:											
Tuckasegee------	0-11	12-27	0.85-1.20	2.0-6.0	0.12-0.17	4.5-6.5	Low----------	0.20	5	5	4-15
	11-60	12-27	1.00-1.40	2.0-6.0	0.11-0.21	4.5-6.0	Low----------	0.20			
Whiteside-------	0-14	5-18	1.30-1.50	2.0-6.0	0.15-0.22	4.5-7.3	Low----------	0.24	5	5	2-8
	14-47	18-27	1.35-1.55	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.24			
	47-53	3-10	1.40-1.60	2.0-6.0	0.04-0.11	4.5-6.0	Low----------	0.15			
	53-70	8-35	1.35-1.60	0.6-6.0	0.10-0.16	4.5-6.0	Low----------	0.24			
Ud. Udorthents, loamy											
UfB*:											
Udorthents.											
Urban land.											
WaD, WaE, WaF, WeC, WeD, WeE, WeF-------------	0-14	5-18	1.00-1.20	2.0-6.0	0.16-0.22	3.6-5.5	Low----------	0.24	3	5	8-20
Wayah	14-40	5-18	1.20-1.60	2.0-6.0	0.09-0.13	4.5-6.0	Low----------	0.15			
	40-65	3-15	1.40-1.65	2.0-6.0	0.05-0.09	4.5-6.0	Low----------	0.10			
WtB*:											
Whiteside-------	0-14	5-18	1.30-1.50	2.0-6.0	0.15-0.22	4.5-7.3	Low----------	0.24	5	5	2-8
	14-47	18-27	1.35-1.55	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.24			
	47-53	3-10	1.40-1.60	2.0-6.0	0.04-0.11	4.5-6.0	Low----------	0.15			
	53-70	8-35	1.35-1.60	0.6-6.0	0.10-0.16	4.5-6.0	Low----------	0.24			
Tuckasegee------	0-11	12-27	0.85-1.20	2.0-6.0	0.12-0.17	4.5-6.5	Low----------	0.20	5	5	4-15
	11-60	12-27	1.00-1.40	2.0-6.0	0.11-0.21	4.5-6.0	Low----------	0.20			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
BaA: Biltmore	A	Frequent	Brief	Jan-Dec	3.5-6.0	Apparent	Dec-May	>60	---	Low	Low	Moderate.
BkB2, BkC2, BkD2: Braddock	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
BrC*:												
Braddock	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
Urban land.												
BuD*, BuF*:												
Burton	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	High	High.
Craggey	D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	High	High.
Rock outcrop.												
CaC, CaD, CaE, CaF: Cashiers	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
CdC, CdD, CdE, CdF, CeC, CeD, CeE, CeF: Chandler	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
ChE, ChF: Cheoah	B	None	---	---	>6.0	---	---	40-60	Soft	Moderate	Low	High.
CnC*, CnD*, CnE*:												
Chestnut	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low	High.
Edneyville	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
CpD*, CpE*, CpF*:												
Cleveland	C	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
Chestnut	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low	High.
Rock outcrop.												

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
CrD*:												
Cowee	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate	High.
Evard	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
Urban land.												
CsD, CsE Cullasaja	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	High.
CuC*, CuD*, CuE*, CuF*:												
Cullasaja	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	High.
Tuckasegee	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	High.
CwA Cullowhee	B/D	Occasional	Very brief	Jan-Dec	1.5-2.0	Apparent	Nov-May	>60	---	Low	High	High.
DfA Dellwood	A	Occasional	Very brief	Dec-Apr	2.0-4.0	Apparent	Jan-Apr	>60	---	Low	Low	Moderate.
DrB Dillard	C	Rare	---	---	2.0-3.0	Apparent	Dec-Apr	>60	---	Moderate	Moderate	High.
DsB, DsC Dillsboro	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
EdC*, EdD*, EdE*, EdF*:												
Edneyville	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
Chestnut	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low	High.
EgB2, EgC2, EgD2 Ellijay	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
EvC*, EvD*, EvE*, EvF*:												
Evard	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
Cowee	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate	High.
FaC, FaD, FaE, FaF Fannin	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
HpA--------------- Hemphill	D	Rare---------	---	---	0-1.0	Apparent	Nov-May	>60	---	High------	High------	High.
JbD*, JbE*:												
Junaluska---------	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate	High.
Brasstown---------	B	None---------	---	---	>6.0	---	---	40-60	Soft	Moderate	Moderate	High.
JtD*, JtE*, JtF*:												
Junaluska---------	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate	High.
Tsali-------------	C	None---------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	High.
NkA--------------- Nikwasi	B/D	Frequent----	Very brief	Jan-Dec	0-1.0	Apparent	Nov-May	>60	---	Moderate	High------	High.
OcD, OcE, OcF, OwD, OwE, OwF---- Oconaluftee	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
Pt*. Pits, quarries												
PwD, PwE, PwF----- Plott	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
RdA--------------- Reddies	B	Occasional	Very brief	Jan-Dec	2.0-3.5	Apparent	Dec-Apr	>60	---	Low------	Low------	Moderate.
RkF*: Rock outcrop.												
Cleveland---------	C	None---------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	High.
RoA--------------- Rosman	B	Occasional	Very brief	Dec-Apr	2.5-5.0	Apparent	Jan-Apr	>60	---	Moderate	Moderate	Moderate.
SaB, SaC, SaD, SbD--------------- Saunook	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
SoD*, SoE*, SoF*:												
Soco--------------	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate	High.
Stecoah-----------	B	None---------	---	---	>6.0	---	---	40-60	Soft	Moderate	Moderate	High.
SrD*, SrE*:												
Spivey------------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
SrD*, SrE*:												
Santeetlah--------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low-------	High.
SvB---------------- Statler	B	Rare---------	---	---	>6.0	---	---	>60	---	Moderate	Low-------	Moderate.
SyA*:												
Sylva-------------	B/D	None---------	---	---	0-1.0	Apparent	Nov-May	>60	---	High-----	High-----	High.
Whiteside---------	B	None---------	---	---	1.5-3.0	Apparent	Nov-May	>60	---	Moderate	Moderate	High.
TaC*, TaD*, TaE*:												
Tanasee-----------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low-------	High.
Balsam------------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	High.
TrE, TrF---------- Trimont	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low-------	High.
TwC*:												
Tuckasegee--------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	High.
Whiteside---------	B	None---------	---	---	1.5-3.0	Apparent	Nov-May	>60	---	Moderate	Moderate	High.
Ud. Udorthents, loamy												
UfB*:												
Udorthents--------	---	Rare---------	---	---	---	---	---	---	---	---	---	---
Urban land.												
WaD, WaE, WaF, WeC, WeD, WeE, WeF--------------- Wayah	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low-------	High.
WtB*:												
Whiteside---------	B	None---------	---	---	1.5-3.0	Apparent	Nov-May	>60	---	Moderate	Moderate	High.
Tuckasegee--------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. LL means liquid limit; PI, plasticity index; MD, maximum dry density; OM, optimum moisture; and NP, nonplastic. The soils are the typical pedons for the soil series in the survey area. For the location of the pedons see "Soil Series and Their Morphology")

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution: Percentage passing sieve--								Percentage smaller than--			LL	PI	Moisture density	
	AASHTO	Unified	3 in.	2 in.	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			MD	OM
														Pct		Lb/ cu ft	Pct
Biltmore sand: (S85NC-099-14)																	
Ap----------- 0-12	A-2-4(0)	SP, SM	---	---	---	---	---	100	88	12	7	4	4	26	NP	97	13
C1-----------12-34	A-2-4(0)	SP, SM	---	---	---	---	---	100	86	12	7	4	4	30	NP	103	17
C2-----------34-52	A-2-4(0)	SM	---	---	---	---	---	100	96	24	14	5	4	34	NP	98	20
Dillsboro loam: (S85NC-099-15)																	
Ap----------- 0-10	A-6(8)	ML, CL	---	---	---	---	100	99	93	66	53	34	27	33	15	106	21
Bt1----------10-23	A-7-6(10)	CL	---	---	100	99	98	95	89	66	52	43	37	42	18	11	19
Rosman fine sandy loam: (S85NC-099-12)																	
Ap----------- 0-15	A-4(4)	SM	---	---	---	---	---	100	99	55	28	15	9	40	NP	92	26
C------------15-60	A-4(5)	SM	---	---	---	---	---	---	100	59	31	15	9	38	NP	92	25
Wayah sandy loam: (S85NC-099-10)																	
A1----------- 0-5	A-5(2)	SM	---	---	99	96	96	94	83	44	26	9	6	48	NP	---	---
Bw-----------14-30	A-2-4(0)	SM	---	---	96	95	94	91	82	35	23	15	11	32	NP	107	18
C------------30-45	A-2-4(0)	SM	---	---	98	98	98	96	87	29	15	11	9	32	NP	---	---
Whiteside fine sandy loam: (S85NC-099-8)																	
Ap----------- 0-14	A-4(2)	SM	---	---	100	99	98	95	81	44	34	18	11	36	8	108	20
Bt1----------14-24	A-6(3)	SC	---	---	---	---	100	96	80	46	39	26	21	33	12	112	21
Cg1----------47-53	A-2-4(0)	SM	---	---	100	99	97	95	73	28	21	16	14	26	NP	121	13

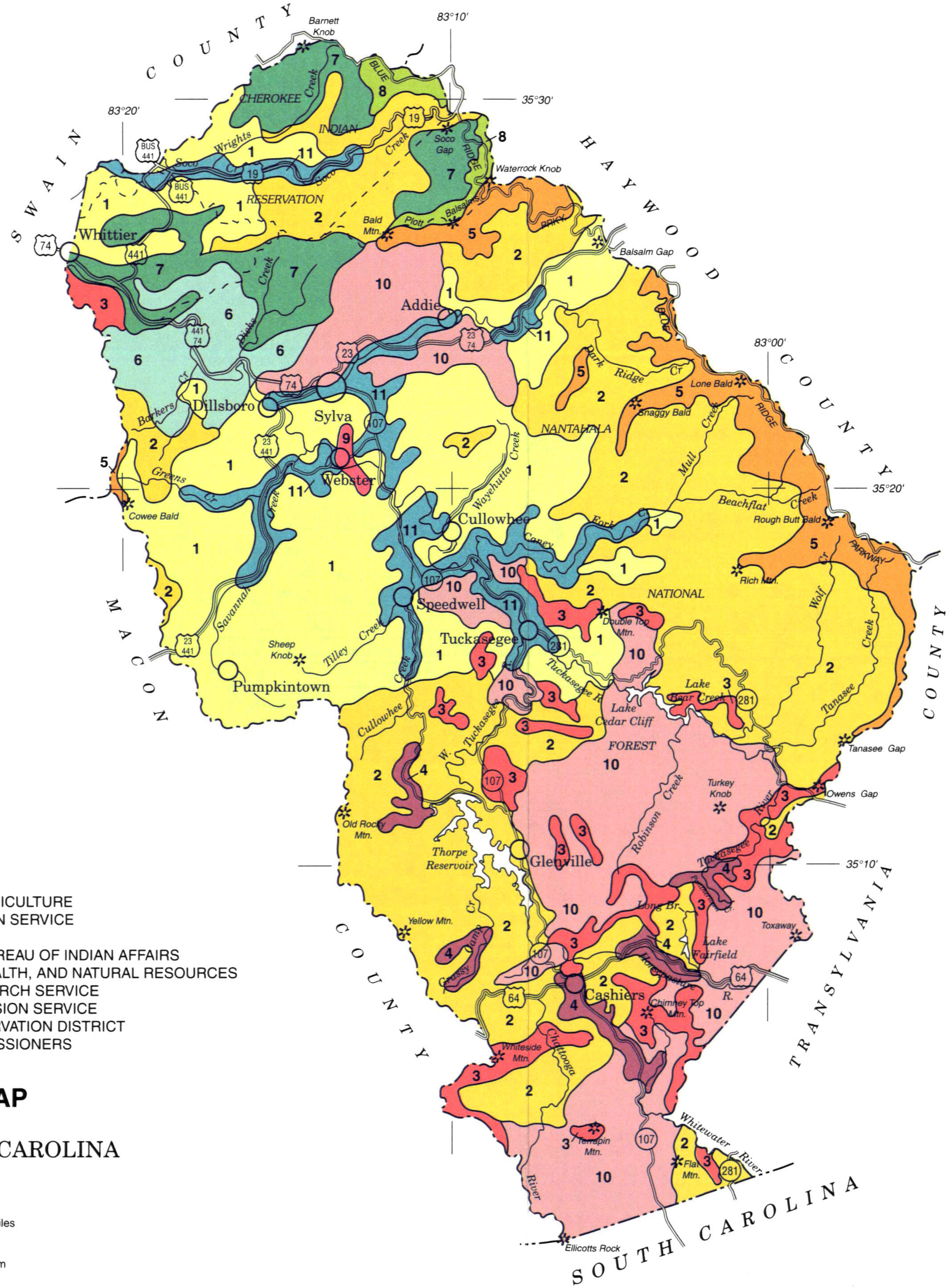
TABLE 18.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Balsam	Loamy-skeletal, mixed, frigid Typic Haplumbrepts
Biltmore	Mixed, mesic Typic Udipsamments
Braddock	Clayey, mixed, mesic Typic Hapludults
Brasstown	Fine-loamy, mixed, mesic Typic Hapludults
Burton	Coarse-loamy, mixed, frigid Typic Haplumbrepts
Cashiers	Coarse-loamy, micaceous, mesic Umbric Dystrochrepts
Chandler	Coarse-loamy, micaceous, mesic Typic Dystrochrepts
Cheoah	Coarse-loamy, mixed, mesic Typic Haplumbrepts
Chestnut	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Cleveland	Loamy, mixed, mesic Lithic Dystrochrepts
Cowee	Fine-loamy, mixed, mesic Typic Hapludults
Craggey	Loamy, mixed, frigid Lithic Haplumbrepts
Cullasaja	Loamy-skeletal, mixed, mesic Typic Haplumbrepts
Cullowhee	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Aquic Haplumbrepts
Dellwood	Sandy-skeletal, mixed, mesic Fluventic Haplumbrepts
Dillard	Fine-loamy, mixed, mesic Aquic Hapludults
Dillsboro	Clayey, mixed, mesic Humic Hapludults
Edneyville	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Ellijay	Fine, mixed, mesic Rhodic Kanhapludalfs
Evard	Fine-loamy, oxidic, mesic Typic Hapludults
Fannin	Fine-loamy, micaceous, mesic Typic Hapludults
Hemphill	Fine, mixed, mesic Typic Umbraqualfs
Junaluska	Fine-loamy, mixed, mesic Typic Hapludults
Nikwasi	Coarse-loamy over sandy or sandy-skeletal, mixed, nonacid, mesic Cumulic Humaquepts
Oconaluftee	Coarse-loamy, mixed, frigid Typic Haplumbrepts
Plott	Coarse-loamy, mixed, mesic Typic Haplumbrepts
Reddies	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Fluventic Haplumbrepts
*Rosman	Coarse-loamy, mixed, mesic Fluventic Haplumbrepts
Santeetlah	Coarse-loamy, mixed, mesic Typic Haplumbrepts
Saunook	Fine-loamy, mixed, mesic Humic Hapludults
Soco	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Spivey	Loamy-skeletal, mixed, mesic Typic Haplumbrepts
Statler	Fine-loamy, mixed, mesic Humic Hapludults
Stecoah	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Sylva	Coarse-loamy, mixed, acid, mesic Humic Haplaquepts
Tanasee	Coarse-loamy, mixed, frigid Typic Haplumbrepts
Trimont	Fine-loamy, mixed, mesic Humic Hapludults
Tsali	Loamy, mixed, mesic, shallow Typic Hapludults
Tuckasegee	Fine-loamy, mixed, mesic Typic Haplumbrepts
Udorthents	Udorthents
Wayah	Coarse-loamy, mixed, frigid Typic Haplumbrepts
Whiteside	Fine-loamy, mixed, mesic Aquic Hapludults

☆ U.S. GOVERNMENT PRINTING OFFICE : 1997—417-265/40508/NRCS

Each area outlined on this map consists of more that one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



SOIL LEGEND*

AREAS OF SOILS THAT HAVE A LOAMY SURFACE LAYER AND SUBSOIL AND FORMED IN MATERIAL WEATHERED FROM HIGH-GRADE METAMORPHIC ROCKS, COLLUVIUM, OR ALLUVIUM AND AREAS OF ROCK OURCROP

1 Evard-Cowee-Saunook-Trimont

2 Plott-Edneyville-Chestnut-Cullasaja

3 Cleveland-Rock outcrop-Chestnut

4 Whiteside-Tuckasegee-Nikwasi

5 Wayah

SOILS THAT HAVE A LOAMY SURFACE LAYER AND SUBSOIL AND FORMED IN MATERIAL WEATHERED FROM METASEDIMENTARY ROCKS

6 Junaluska-Brasstown-Tsali

7 Soco-Stecoah-Cheoah

8 Oconaluftee

SOILS THAT HAVE A LOAMY SURFACE LAYER AND A CLAYEY SUBSOIL AND FORMED IN MATERIAL WEATHERED FROM ULTRAMAFIC ROCKS

9 Ellijay

SOILS THAT HAVE A VERY HIGH CONTENT OF MICA AND A LOAMY SURFACE LAYER AND SUBSOIL AND FORMED IN MATERIAL WEATHERED FROM HIGH-GRADE METAMORPHIC ROCKS

10 Chandler-Fannin-Cashiers

SOILS THAT HAVE A LOAMY SURFACE LAYER AND A CLAYEY, LOAMY, OR SANDY SUBSOIL AND FORMED IN OLD AND RECENT ALLUVIUM OR COLLUVIUM ALONG THE MAJOR STREAMS

11 Braddock-Nikwasi-Dellwood-Cullowhee

* The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1991

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
FOREST SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR, BUREAU OF INDIAN AFFAIRS
NORTH CAROLINA DEPARTMENT OF THE ENVIRONMENT, HEALTH, AND NATURAL RESOURCES
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA COOPERATIVE EXTENSION SERVICE
JACKSON COUNTY SOIL AND WATER CONSERVATION DISTRICT
JACKSON COUNTY BOARD OF COMMISSIONERS

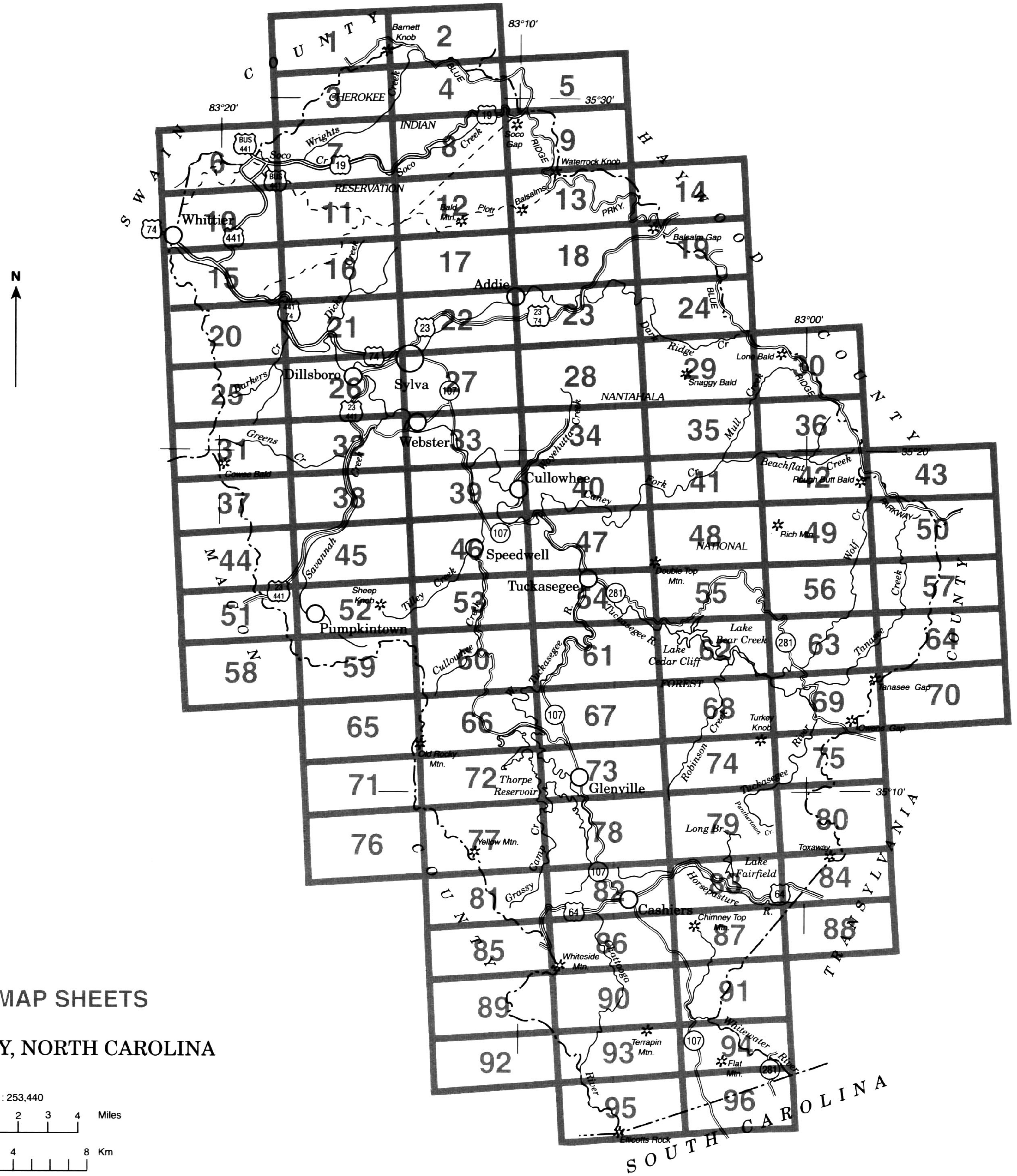
GENERAL SOIL MAP

JACKSON COUNTY, NORTH CAROLINA

Scale 1 : 253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km



INDEX TO MAP SHEETS

JACKSON COUNTY, NORTH CAROLINA

Scale 1 : 253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

SOIL LEGEND

Map symbols consist of a combination of letters or of letters and numbers. The first letter is the initial one of the map unit name. The lowercase letter that follows separates map units having names that begin with the same letter, except that it does not separate sloping or eroded phases. The second capital letter indicates the class of slope. Symbols without a slope letter are for soils classified at a higher taxonomic level, or miscellaneous areas. A final number of 2 indicates that the soil is moderately eroded.

SYMBOL	NAME
BaA	Biltmore sand, 0 to 3 percent slopes, frequently flooded
BkB2	Braddock clay loam, 2 to 8 percent slopes, eroded
BkC2	Braddock clay loam, 8 to 15 percent slopes, eroded
BkD2	Braddock clay loam, 15 to 30 percent slopes, eroded
BrC	Braddock-Urban land complex, 2 to 15 percent slopes
BuD	Burton-Craggey-Rock outcrop complex, windswept, 8 to 30 percent slopes, stony
BuF	Burton-Craggey-Rock outcrop complex, windswept, 30 to 95 percent slopes, stony
CaC	Cashiers gravelly fine sandy loam, 8 to 15 percent slopes,
CaD	Cashiers gravelly fine sandy loam, 15 to 30 percent slopes
CaE	Cashiers gravelly fine sandy loam, 30 to 50 percent slopes
CaF	Cashiers gravelly fine sandy loam, 50 to 95 percent slopes
CdC	Chandler gravelly fine sandy loam, 8 to 15 percent slopes
CdD	Chandler gravelly fine sandy loam, 15 to 30 percent slopes
CdE	Chandler gravelly fine sandy loam, 30 to 50 percent slopes
CdF	Chandler gravelly fine sandy loam, 50 to 95 percent slopes
CeC	Chandler gravelly fine sandy loam, 8 to 15 percent slopes, windswept
CeD	Chandler gravelly fine sandy loam, 15 to 30 percent slopes, windswept
CeE	Chandler gravelly fine sandy loam, 30 to 50 percent slopes, windswept
CeF	Chandler gravelly fine sandy loam, 50 to 95 percent slopes, windswept
ChE	Cheoah channery loam, 30 to 50 percent slopes
ChF	Cheoah channery loam, 50 to 95 percent slopes
CnC	Chestnut-Edneyville complex, windswept, 8 to 15 percent slopes, stony
CnD	Chestnut-Edneyville complex, windswept, 15 to 30 percent slopes, stony
CnE	Chestnut-Edneyville complex, windswept, 30 to 50 percent slopes, stony
CpD	Cleveland-Chestnut-Rock outcrop complex, windswept, 15 to 30 percent slopes
CpE	Cleveland-Chestnut-Rock outcrop complex, windswept, 30 to 50 percent slopes
CpF	Cleveland-Chestnut-Rock outcrop complex, windswept, 50 to 95 percent slopes
CrD	Cowee-Evard-Urban land complex, 15 to 30 percent slopes
CsD	Cullasaja very cobbly fine sandy loam, 15 to 30 percent slopes, extremely bouldery
CsE	Cullasaja very cobbly fine sandy loam, 30 to 50 percent slopes, extremely bouldery
CuC	Cullasaja-Tuckasegee complex, 8 to 15 percent slopes, stony
CuD	Cullasaja-Tuckasegee complex, 15 to 30 percent slopes, stony
CuE	Cullasaja-Tuckasegee complex, 30 to 50 percent slopes, stony
CuF	Cullasaja-Tuckasegee complex, 50 to 90 percent slopes, stony
CwA	Cullowhee fine sandy loam, 0 to 2 percent slopes, occasionally flooded
DfA	Dellwood gravelly fine sandy loam, 0 to 3 percent slopes, occasionally flooded
DrB	Dillard loam, 1 to 5 percent slopes, rarely flooded
DsB	Dillsboro loam, 2 to 8 percent slopes
DsC	Dillsboro loam, 8 to 15 percent slopes
EdC	Edneyville-Chestnut complex, 8 to 15 percent slopes, stony
EdD	Edneyville-Chestnut complex, 15 to 30 percent slopes, stony
EdE	Edneyville-Chestnut complex, 30 to 50 percent slopes, stony
EdF	Edneyville-Chestnut complex, 50 to 95 percent slopes, stony
EgB2	Ellijay silty clay loam, 2 to 8 percent slopes, eroded
EgC2	Ellijay silty clay loam, 8 to 15 percent slopes, eroded
EgD2	Ellijay silty clay loam, 15 to 30 percent slopes, eroded
EvC	Evard-Cowee complex, 8 to 15 percent slopes
EvD	Evard-Cowee complex, 15 to 30 percent slopes
EvE	Evard-Cowee complex, 30 to 50 percent slopes
EvF	Evard-Cowee complex, 50 to 95 percent slopes
FaC	Fannin fine sandy loam, 8 to 15 percent slopes
FaD	Fannin fine sandy loam, 15 to 30 percent slopes
FaE	Fannin fine sandy loam, 30 to 50 percent slopes
FaF	Fannin fine sandy loam, 50 to 95 percent slopes

SYMBOL	NAME
HpA	Hemphill clay loam, 0 to 3 percent slopes, rarely flooded
JbD	Junaluska-Brasstown complex, 15 to 30 percent slopes
JbE	Junaluska-Brasstown complex, 30 to 50 percent slopes
JtD	Junaluska-Tsali complex, 15 to 30 percent slopes
JtE	Junaluska-Tsali complex, 30 to 50 percent slopes
JtF	Junaluska-Tsali complex, 50 to 95 percent slopes
NkA	Nikwasi fine sandy loam, 0 to 2 percent slopes, frequently flooded
OcD	Oconaluftee channery loam, 15 to 30 percent slopes
OcE	Oconaluftee channery loam, 30 to 50 percent slopes
OcF	Oconaluftee channery loam, 50 to 95 percent slopes
OwD	Oconaluftee channery loam, windswept, 15 to 30 percent slopes
OwE	Oconaluftee channery loam, windswept, 30 to 50 percent slopes
OwF	Oconaluftee channery loam, windswept, 50 to 95 percent slopes
Pt	Pits, quarries
PwD	Plott fine sandy loam, 15 to 30 percent slopes, stony
PwE	Plott fine sandy loam, 30 to 50 percent slopes, stony
PwF	Plott fine sandy loam, 50 to 95 percent slopes, stony
RdA	Reddies fine sandy loam, 0 to 2 percent slopes, occasionally flooded
RkF	Rock outcrop-Cleveland complex, windswept, 30 to 95 percent slopes
RoA	Rosman fine sandy loam, 0 to 2 percent slopes, occasionally flooded
SaB	Saunook gravelly loam, 2 to 8 percent slopes
SaC	Saunook gravelly loam, 8 to 15 percent slopes
SaD	Saunook gravelly loam, 15 to 30 percent slopes
SbD	Saunook gravelly loam, 15 to 30 percent slopes, stony
SoD	Soco-Stecoah complex, 15 to 30 percent slopes
SoE	Soco-Stecoah complex, 30 to 50 percent slopes
SoF	Soco-Stecoah complex, 50 to 95 percent slopes
SrD	Spivey-Santeetlah complex, 15 to 30 percent slopes, stony
SrE	Spivey-Santeetlah complex, 30 to 50 percent slopes, stony
SvB	Statler loam, 1 to 5 percent slopes, rarely flooded
SyA	Sylva-Whiteside complex, 0 to 2 percent slopes
TaC	Tanasee-Balsam complex, 8 to 15 percent slopes, stony
TaD	Tanasee-Balsam complex, 15 to 30 percent slopes, stony
TaE	Tanasee-Balsam complex, 30 to 50 percent slopes, stony
TrE	Trimont gravelly loam, 30 to 50 percent slopes, stony
TrF	Trimont gravelly loam, 50 to 95 percent slopes, stony
TwC	Tuckasegee-Whiteside complex, 8 to 15 percent slopes
Ud	Udorthents, loamy
UfB	Udorthents-Urban land complex, 0 to 5 percent slopes, rarely flooded
WaD	Wayah sandy loam, 15 to 30 percent slopes, stony
WaE	Wayah sandy loam, 30 to 50 percent slopes, stony
WaF	Wayah sandy loam, 50 to 95 percent slopes, stony
WeC	Wayah sandy loam, windswept, 8 to 15 percent slopes, stony
WeD	Wayah sandy loam, windswept, 15 to 30 percent slopes, stony
WeE	Wayah sandy loam, windswept, 30 to 50 percent slopes, stony
WeF	Wayah sandy loam, windswept, 50 to 95 percent slopes, stony
WtB	Whiteside-Tuckasegee complex, 2 to 8 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Davis Airstrip

Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER
(sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 173
- Federal — 287
- State — 52
- Secondary — 1287
- Indian Reserv. Road — 13

RAILROAD

POWER TRANSMISSION LINE
(normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small (Named where applicable) — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban area) (occupied)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — BaA EgB2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

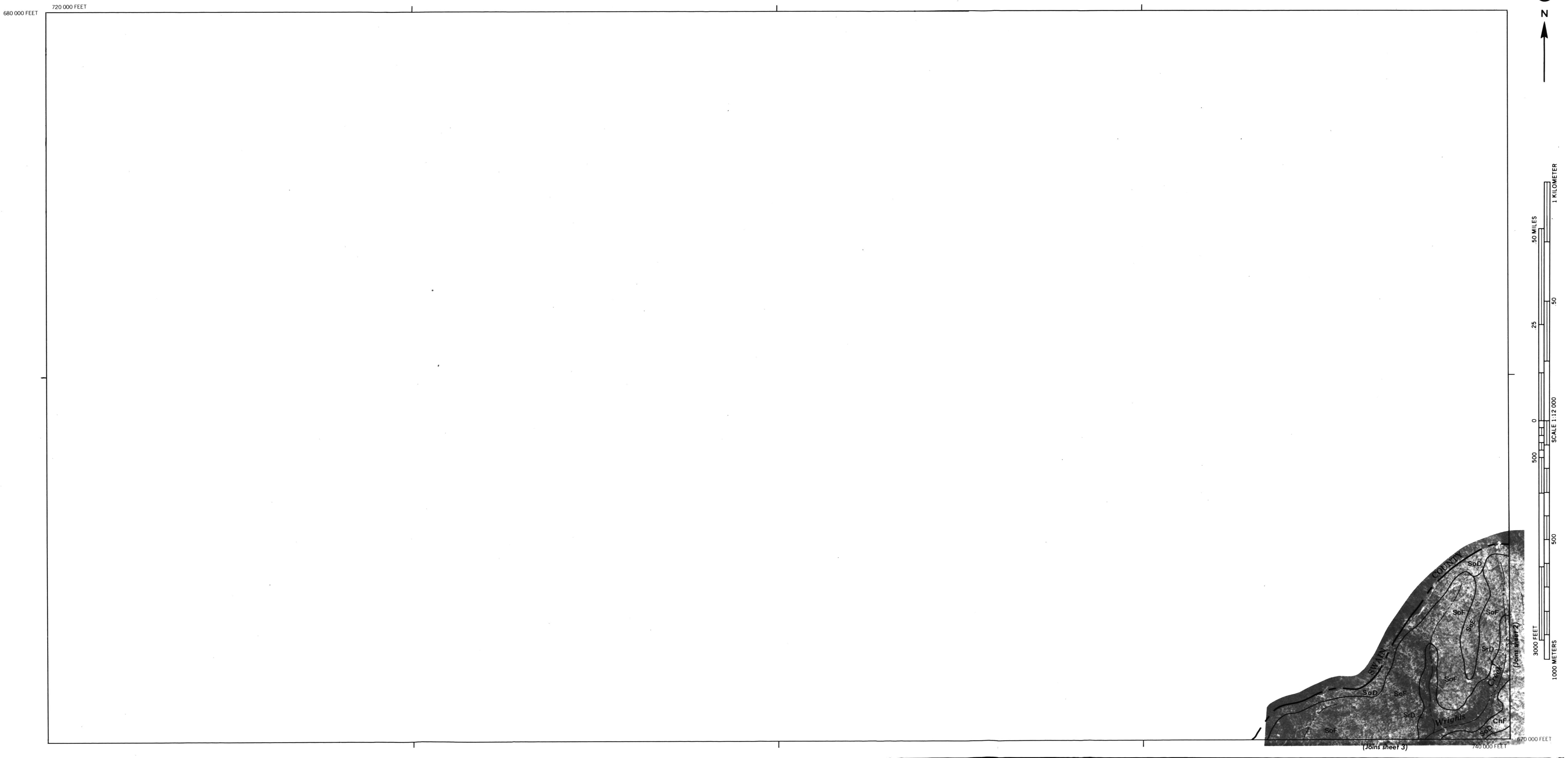
DEPRESSION OR SINK

SOIL SAMPLE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

SOIL SURVEY OF JACKSON COUNTY, NORTH CAROLINA — SHEET NO. 1

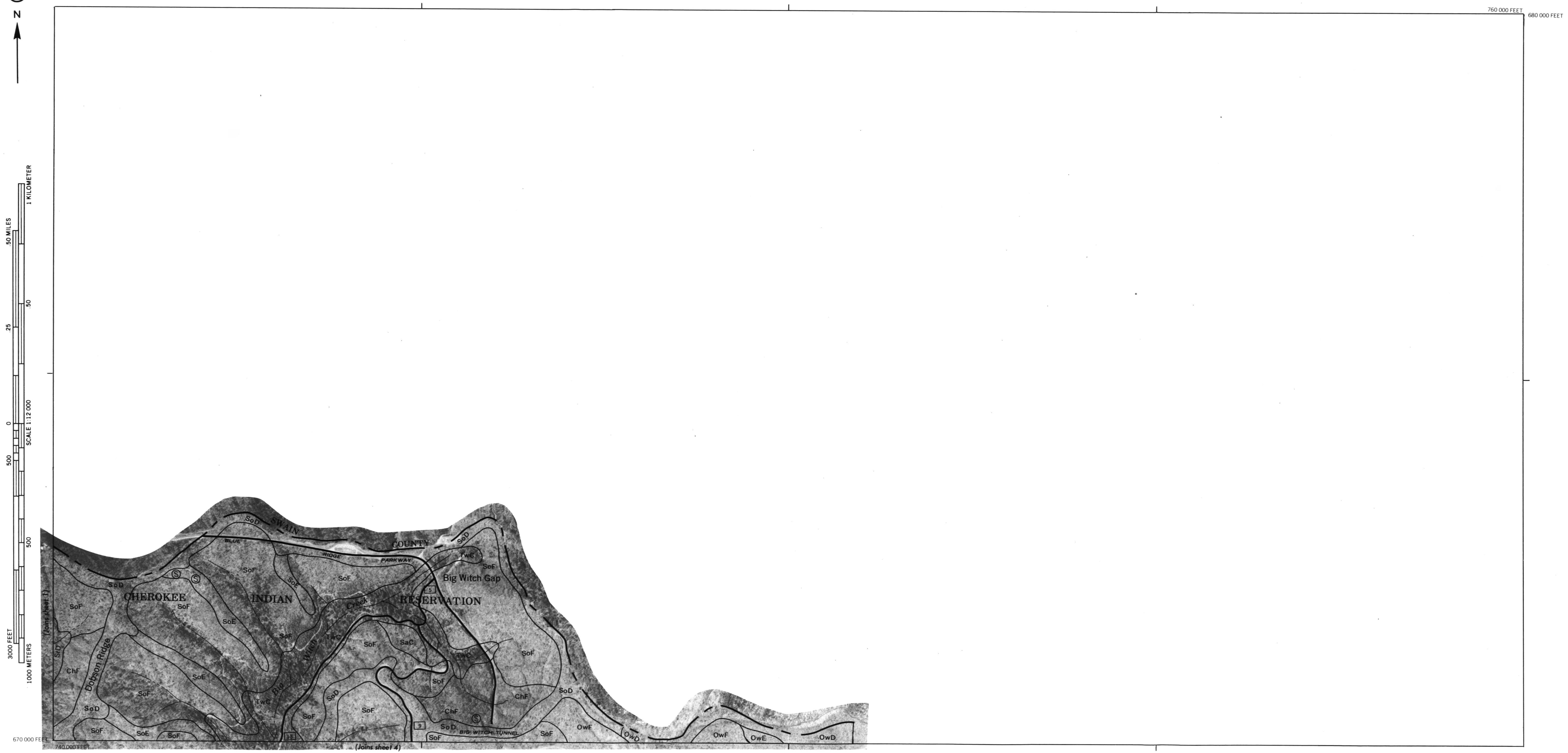


JACKSON COUNTY, NORTH CAROLINA NO. 1

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are from 1980 orthophotography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

2

SOIL SURVEY OF JACKSON COUNTY, NORTH CAROLINA — SHEET NO. 2



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JACKSON COUNTY, NORTH CAROLINA NO. 2

SOIL SURVEY OF JACKSON COUNTY, NORTH CAROLINA — SHEET NO. 3

JACKSON COUNTY, NORTH CAROLINA NO. 3

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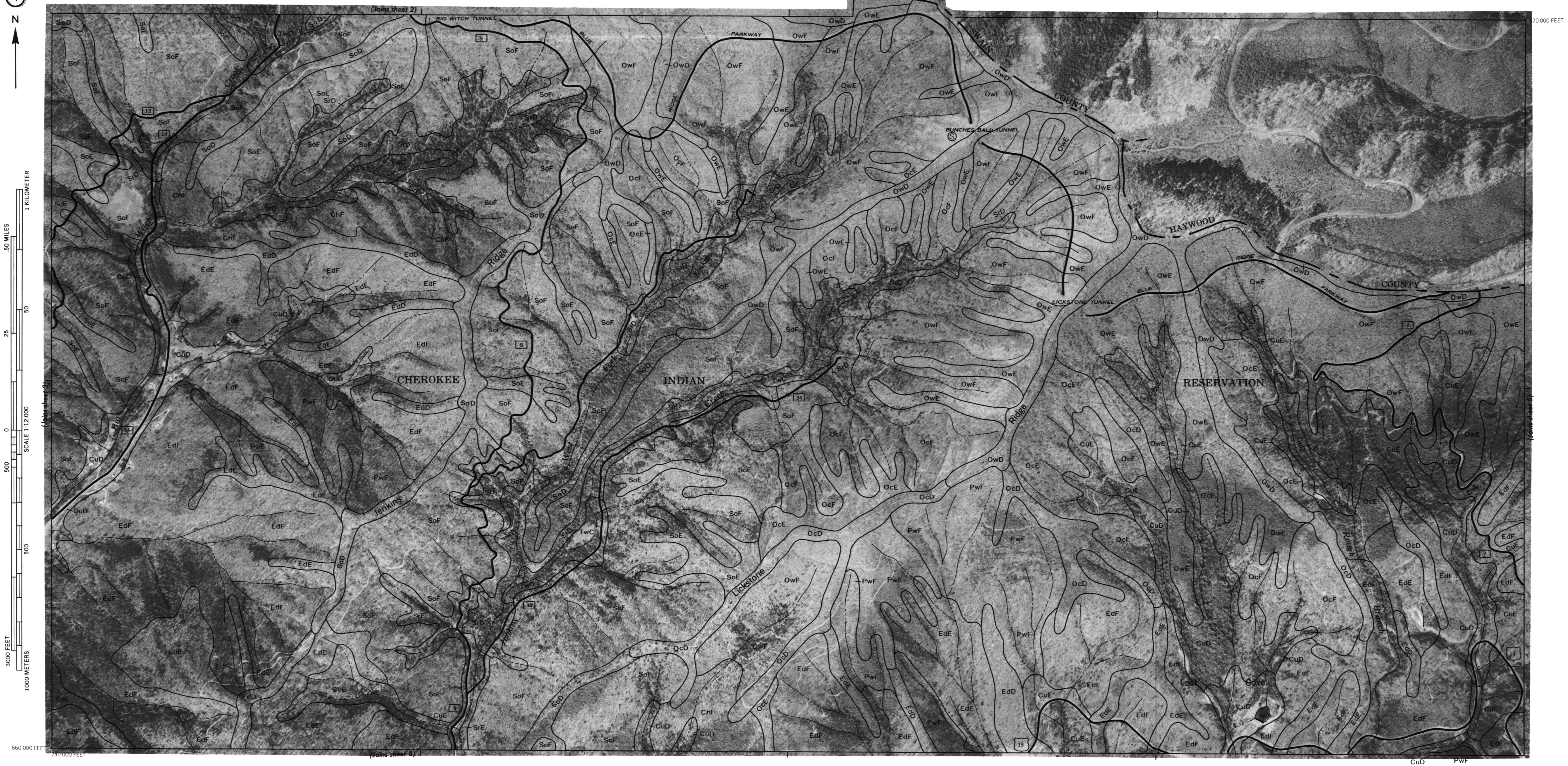
SOIL SURVEY OF JACKSON COUNTY, NORTH CAROLINA — SHEET NO. 4



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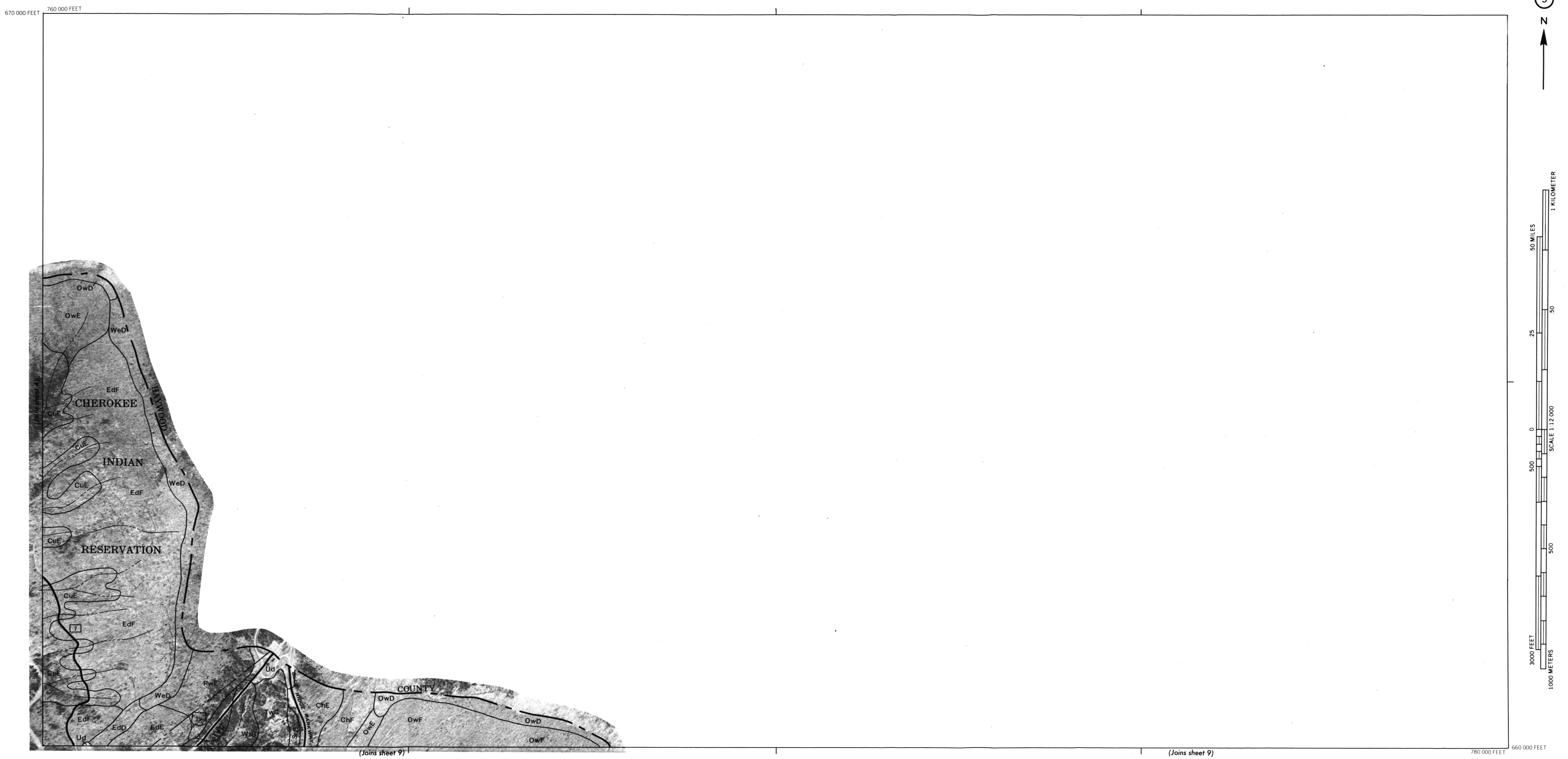
JACKSON COUNTY, NORTH CAROLINA NO. 4



JACKSON COUNTY, NORTH CAROLINA NO. 5

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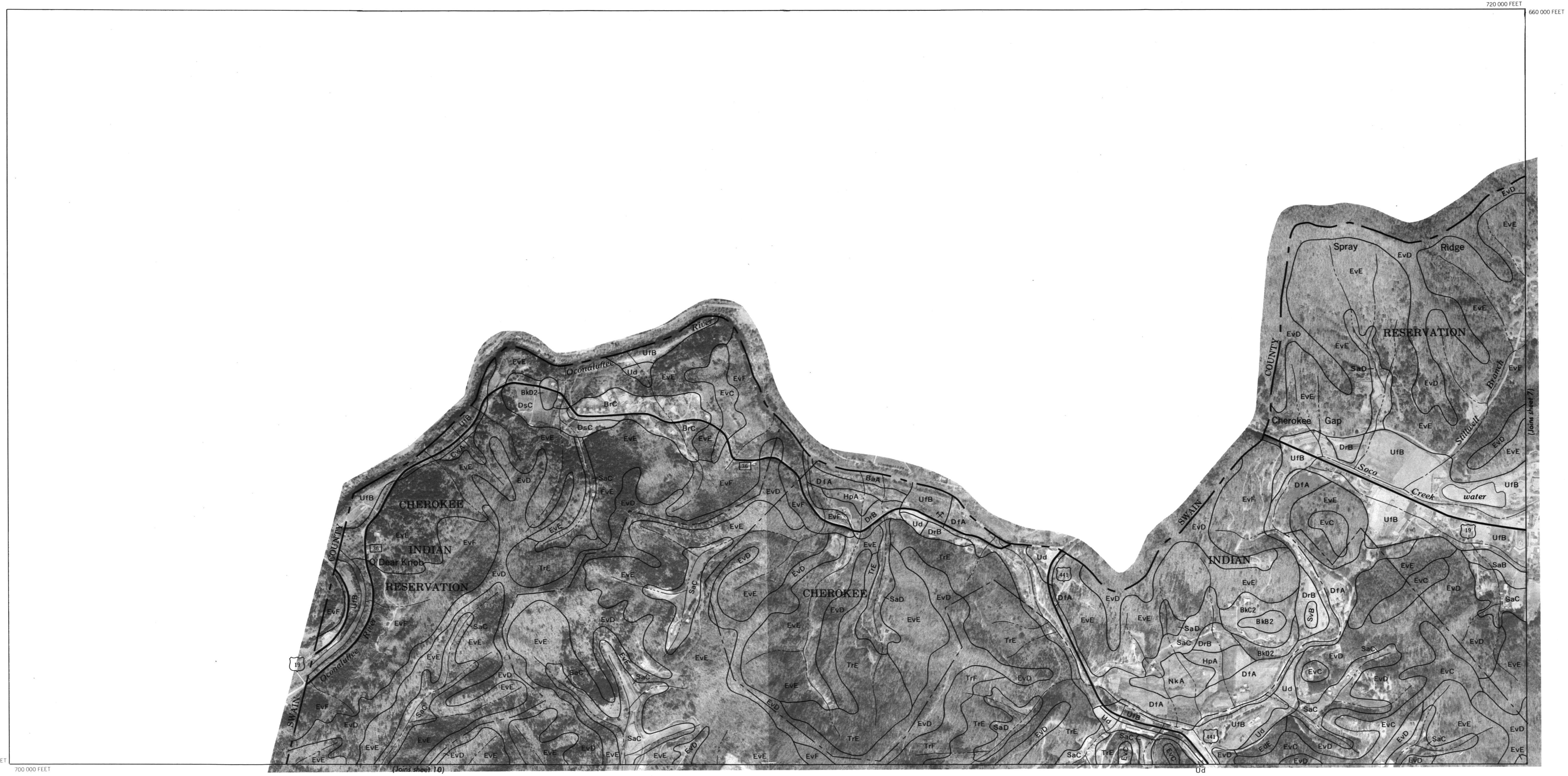
SOIL SURVEY OF JACKSON COUNTY, NORTH CAROLINA — SHEET NO. 6

6

N

1 KILOMETER
50 MILES
.50
25
0
SCALE 1:12 000
500
500
3000 FEET
1000 METERS



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JACKSON COUNTY, NORTH CAROLINA NO. 6

JACKSON COUNTY, NORTH CAROLINA NO. 7

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